The scope of political redistribution with proportional income taxation

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The Scope of Political Redistribution with Income Taxation

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Abstract

This paper investigates the politicians' incentives to pursue income redistribution when governments are constrained to levy taxes on labor income and this creates distortions. Politicians who strive to be elected may strategically redistribute through in-kind rather than cash transfers and overprovide consumption of goods. I show that the overprovision of in-kind transfers reduces the disincentive effects of taxation in labor effort and enlarges the pool of resources for political redistribution. As a result, politicians are able to implement larger redistributive transfers and improve the well-being of swing voters. Hence, electoral competition for pivotal voters provides politicians incentives to implement redistributive schedules that reduce distortions in labor markets and improve the efficiency of the taxation system.

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1 Introduction

Governments modify on a large scale the distribution of income that would be generated by private markets without public intervention.[1]The most important component of this redistribution is undertaken by raising taxes in order to fund both cash transfers and the public provision of services such as health care, education or childcare.[2]Furthermore, governments are usually constrained to raise revenues through taxes over earned labor income, capital gains or the consumption of private goods. Therefore, the redistribution of market income distorts economic decisions and creates welfare losses (Feldstein, 1995, 1999; Salanié, 2003). Do inefficiencies generated by taxation affect the composition of redistributive spending? Has redistribution through in-kind transfers different effects on efficiency than cash transfers?

Normative analysis has explored under what circumstances the provision of in-kind transfers might increase the efficiency of the taxation system (Guesnerie and Roberts, (1984); Gahvari (1994); and Currie and Gahvari (2008) for a comprehensive survey of the literature). In particular, benevolent governments should fund in-kind transfers that increase labor effort in order to reduce distortions generated by income taxation. However, the redistribution of income is a political decision undertaken by elected politicians who require the support of citizens. Why should politicians implement policies that increase efficiency?

Indeed, political economy has longly discussed the potential distortions and welfare losses introduced by democratic policymaking (Besley and Coate, 1998; Lizzeri and Persico, 2001). As an example, recent contributions by Acemoglu et al. (2008, 2010, 2011) point out how political economy constraints might distort the dynamic resource allocation and the structure of taxation**.** Furthermore, in the particular case in which income redistribution is carried out through in-kind transfers, Epple and Romano (1996a) highlighted the allocative inefficiencies created by the political use of in-kind transfers.

In contrast with previous contributions, this paper shows that electoral competition might provide incentives to implement redistributive schedules that reduce the efficiency cost of income taxation. In fact, politicians who strive to be elected should consider the effect of income redistribution on individuals' incentives to work. In particular, politicians might fund in-kind transfers in order to reduce distortions in labor markets and enlarge the scope of redistribution. Overall, this paper points out that political competition implements a size and composition of redistributive spending that minimize the deadweight losses created by income taxation.

[1]See for instance Alesina and Glaeser (2004) for a comprehensive analysis of redistributive policies in OECD countries. The scope of interventions range from regulations in labor markets to social insurance and to budget interventions through taxes and transfers.

[2]Public Economics usually refers by *in-kind transfers* the public funding of the consumption of specific commodities, regardless of whether their production is public or private. These in-kind transfers are significant and represent on average one third of the budget and around 15% of GDP in advanced economies. See Currie and Gahvari (2008) and the OECD Economic Outlook (2009) for detailed data.

In order to investigate the incentives for political redistribution, I build a static electoral competition model in which politicians propose redistributive policies which require the support of citizens to be implemented. I consider a competitive economy in which individuals belong to a finite number of groups. Each group exhibits different productivities and individuals must choose their labor effort which is costly in terms of well-being. Individuals value their available income and the consumption of goods such as health care which can be acquired in private markets. Furthermore, citizens must elect a government which might levy linear taxes over earned labor income to fund cash and in-kind transfers. Government is choosen from two political parties who credibly commit to economic policy proposals uniquely to win elections. Furthermore, each political party holds differentiated fixed positions on ideological issues non-related with economic policy. Citizens exhibit heterogeneous biases toward parties ideological positions. Each voter gives her support to the party which yields higher well-being given policy platforms, ideological biases and a common valuation of competing parties. The party that obtains the support of more than half of the population implements the announced redistributive policies.

Several appealing results emerge from the proposed analysis. I find that politicians who compete for office have incentives to change the market distribution of income to obtain the support of citizens. In particular, politicians have incentives to raise taxes and redistribute income toward groups of voters with lower earning abilities and more pivotal voters who could swing their vote. However, distortions and output losses generated by income taxation limit the scope of political redistribution. In order to overcome these limitations, politicians might constrain individuals to consume more in-kind transfers than the amount of goods that they would buy in private markets if targeted resources were given in cash. The overprovision of in-kind transfers reduces the disincentive effects of redistribution in labor effort and enlarges available resources for political redistribution. As a result, politicians are able to implement redistributive transfers that improve the well-being of pivotal voters.

Furthermore, politics removes the economy from an efficient competitive market allocation because of distortions created by income taxation. However this paper shows how the electoral competition for marginal voters leads politicians to choose a composition of redistributive transfers that reduce allocative inefficiencies generated by taxation. The idea that incentives to be elected force politicians to increase efficiency was first raised by Wittman (1989,1995) but few work has investigated the welfare enhancing role of political competition. One exception is Besley et al. (2010) which provides theorical and empirical evidence for the US states on how the extent of political competition might generate efficiency gains. Another example is Lopez-Rodriguez (2010) who points out the role of electoral competition to correct externalities and reach allocative efficiency. This paper shows that this mechanism could be also present in the political choice of size and composition of redistributive spending.

Few contributions have analyzed the incentives for political redistribution through in-kind transfers funded with proportional income taxation (Fernandez and Rogerson, 1995; Epple and Romano,

1996a,b; Gouveia, 1997; Levy, 2005). Nevertheless, these contributions impose severe policy constraints in order to ensure the existence of equilibria which limit the generality of their analysis. In particular, proposed models constrain in-kind transfers to be uniform for all the population and they do not consider the possibility of redistribution through cash transfers. Furthermore, individuals' income is not the result of labor effort but given as fixed. Therefore, it prevents to examine how workers' behavioral responses to policies affect the characterization of redistributive schedules.[3]

In order to overcome the limitations imposed by modeling constraints, this paper presents a model which builds on the literature of distributive politics established by Lindbeck and Weibull (1987) and Dixit and Londregan (1996). In particular, by exploiting probabilistic voting I relax the constraints in policy tools allowing for differential targeting of cash and in-kind transfers across groups of voters. Moreover, I extend distributive politics contributions considering that voters' income results from labor decisions, and politicians levy taxes over citizens' earned income. This allows to analyze the distortions in labor markets created by redistribution and therefore the trade-off faced by politicians between efficiency and political redistribution. Furthermore, it permits to examine how the composition of redistributive spending affects individuals' incentives to work and governments' tax revenues. An appealing result of the analysis shows that politicians consider the differential impact on government's tax revenues of targeting cash and in-kind transfers among groups with different productivities. In particular, politicians have incentives to target high productivity groups with in-kind rather than cash to reduce tax losses generated by income taxation.

This paper rationalizes the political use of in-kind transfers as a tool of income redistribution in the presence of distortionary policy tools. However, this rationalization does not rule out other sensible explanations proposed in the literature. For instance, the presence of market failures such as external effects or imperfect information might justify the public funding of in-kind transfers.[4]Nevertheless, I abstract away potential market imperfections in order to focus the analysis on the effect of politics on the distribution of income.

The paper is organized as follows. In the next section, I present the benchmark of a competitive market allocation. Section III introduces an electoral competition game in order to analyze the incentives for political redistribution through income taxation, cash and in-kind transfers. Section IV examines the political choice of income taxation and the allocation of redistributive spending among groups of voters. Section V discusses how the electoral competition for marginal voters might improve the efficiency of the taxation system. Finally, the last section concludes and discusses potential further research.

[3]Levy (2005) allows the possibility of both cash and in-kind redistribution. However, transfers are constrained to be uniform across groups and she abstracts labor supply decisions; Meltzer and Richard (1985) allow for uniform cash transfers and consider income as a result of labor effort but they focus on commodity taxation.

[4]In the presence of asymmetric information, in-kind transfers can be used as an screening device to redistribute toward low income individuals (Nichols and Zeckhauser, 1982; Balckorby and Donaldson, 1988; Bruce and Waldman, 1991). Interdependent preferences such as externalities has also been suggested as one of the leading candidates to explain the use of in-kind transfers (Currie and Gahvari, 2008).

2 The Economy: Market Allocation

Consider an economy with a continuum of citizens whose measure can be normalized to 1. Individuals are endowed with $\overline{T} = 1$ units of time and idiosyncratic abilities θ. There are J ability types, $\{\theta^j\}_{j=1}^J$, with measure μ^j. No ability group constitutes a majority of the population.[5]Each individual can sell her time in competitive labor markets. The wage per hour of work, w^j, in units of a numeraire commodity, is equal to the productivity associated to her ability type (i.e. $w^j = \theta^j$). Individuals choose the amount of time devoted to work, n^j. The rest of their time is enjoyed as leisure, $l^j = 1 - n^j$. Therefore, type θ^j individual's market income, y^j, is given by:

$$y^j = w^j n^j = w^j(1 - l^j) \tag{1}$$

The aggregate income in the market economy is defined as:

$$y = \sum_{j=1}^{J} \mu^j w^j n^j \tag{2}$$

In this economy, perfectly competitive firms produce health services at different quality levels, h.[6]Firms have available a linear technology that requires qh units of the numeraire commodity to produce one unit of health services at quality h. Individuals have homogeneous preferences over the consumption of the numeraire commodity, c, health care quality, h, and leisure, l. Preferences are represented by the following utility function:

$$U^j(c^j, h^j, l^j) = u(c^j, h^j, 1 - n^j) \qquad \forall j \tag{3}$$

This function is continuous, twice differentiable, strictly increasing ($u_c > 0, u_h > 0, u_l > 0$, where subscripts denote partial derivatives with respect to the identified argument) and strictly concave ($u_{cc} < 0$, $u_{hh} < 0$, $u_{ll} < 0$) in c, h and l. Marginal utilities are bounded away from 0 and $u_c(0, h, l) = \infty$, $u_h(c, 0, l) = \infty$ and $u_l(c, h, 0) = \infty$. Leisure, health care and numeraire commodity are assumed to be normal goods.

Competitive firms with constant returns to scale produce whatever quality of health care that citizens demand at price, p_h, equal to marginal cost, q. Individuals choose their supply of labor, n^j, given the competitive wage associated to their ability level, w^j. Furthermore, individuals decide the quality of health care that they acquire at competitive market price, p_h, given the market income obtained by their labor effort, y^j. The residual income is left for consumption of the numeraire commodity, c^j. Thus, ability type θ^j individual's budget constraint is given by:

$$y^j = w^j n^j = c^j + p_h h^j \qquad \forall j \tag{4}$$

[5]As an alternative, groups could be interpreted as geographic districts (e.g.: states, regions or municipalities) in which an average individual in district j exhibits a productivity (output per unit of time spent working) of w^j.

[6]For expositional reasons, I focus on health care but the analysis is also valid for other goods that could be subject to in-kind transfers such as child and elderly care or education.

The choice problem for an individual who belongs to the group j can be written as:

$$\forall i \in j \quad \max_{h^j, n^j} \; U^j(c^j, h^j, l^j) = u(w^j n^j - p_h h^j, h^j, 1 - n^j) \quad \text{s.t. } h^j \geq 0 \;\; \text{and } 0 \leq n^j \leq 1 \tag{5}$$

The optimal market choice, $(c_m^{j*}, h_m^{j*}, n_m^{j*})$ for individuals with ability type θ^j, satisfies the FOCs for an interior optimum such that:

$$u_h(c_m^{j*}, h_m^{j*}, 1 - n_m^{j*}) = p_h u_c(c_m^{j*}, h_m^{j*}, 1 - n_m^{j*}) \qquad \forall j \tag{6}$$

$$w^j u_c(c_m^{j*}, h_m^{j*}, 1 - n_m^{j*}) = u_l(c_m^{j*}, h_m^{j*}, 1 - n_m^{j*}) \qquad \forall j \tag{7}$$

These relations implictly define the marshallian demand function for health care quality and numeraire commodity:

$$h_m^{j*} = h_m^j(w^j, p_h) \qquad c_m^{j*} = c_m^j(w^j, p_h) \qquad \forall j \tag{8}$$

Furthermore, individuals participate into the labor market and their effort choice given by the labor supply function is implicitly defined by (6) and (7):

$$n_m^{j*} = n_m^j(w^j, p_h) \qquad \forall j \tag{9}$$

Definition (Market Allocation): A competitive market equilibrium is an allocation of numeraire commodity and health services quality, $\{c_m^{j*}, h_m^{j*}\}_{j=1}^J$, and a supply of hours of work, $\{n_m^{j*}\}_{j=1}^J$, for each ability type, such that individuals solve problem (5); and competitive firms with constant returns to scale produce whatever quality of health care that individuals demand at price, p_h, equal marginal cost, q. In equilibrium, the market economy feasibility constraint holds with equality:

$$\sum_{j=1}^{J} \mu^j c_m^{j*} + \sum_{j=1}^{J} \mu^j p_h h_m^{j*} = \sum_{j=1}^{J} \mu^j w^j n_m^{j*} \tag{10}$$

In a competitive equilibrium, the rate at which consumers are willing to trade health services for numeraire commodity, $MRS_{c,h}$, is equal for all individuals and equal to the rate at which the economy is able to transform numeraire into health care quality, $MRT_{h,c}$. Furthermore, the rate at which individuals are willing to trade leisure for income is equal to the competitive wage for each ability type. Hence, Market allocation is Pareto Optimal.

$$MRS_{h,c}^j = MRT_{h,c} = q \qquad \forall\, j \in \{1, ..., J\} \tag{11}$$

$$MRS_{l,c}^j = w^j \quad \forall\, j \in \{1, ..., J\} \tag{12}$$

Market equilibrium yields an allocation of resources such that individuals who belong to groups with larger abilities choose higher quality of health services and consume larger amounts of numeraire good than individuals who belong to groups with lower abilities. Furthermore, labor effort is lower for the more productive individuals. This folllows directly from assumptions about homogeneity of preferences and normality of goods.

3 The Polity: Political Game

The economy presented above constitutes a representative democracy where individuals elect a government to rule economic policy. The government is elected from two office-motivated political parties, $P \in \{A, B\}$, that compete in elections. Parties are able to make credible commitments on taxation and spending policies. I assume that voting is costless, nobody abstains and winning corresponds to obtaining the support of more than half of the population.

The government is able to levy taxes on labor income earned by citizens in competitive markets. I assume that only a linear income taxation schedule is feasible, $0 \leq t \leq 1$. The revenues raised by income taxation can be devoted to fund both cash (i.e. numeraire commodity) and in-kind group-specific transfers. In-kind transfers take the form of non-tradable conditional transfers that citizens can only spend to acquire health care in private markets.

Let s_P^j denote the cash transfer targeted to group j and t_P be the linear income tax commited by party P. Furthermore, politicians can target groups with in-kind transfers, h_{gP}^j, which marginal cost is equal to the market price, p_h. Politicians can credibly commit to a policy platform $x_P = (t_P, \{s_P^j\}_{j=1}^J, \{h_{gP}^j\}_{j=1}^J)$ to be implemented if party P wins the elections. The promised allocation of cash and in-kind transfers across groups by political parties must satisfy the government's budget constraint:

$$\sum_{j=1}^{J} \mu^j s_P^j + \sum_{j=1}^{J} \mu^j p_h h_{gP}^j = t_P \sum_{j=1}^{J} \mu^j w^j n_P^j \equiv t_P y_P \tag{13}$$

Citizens care about their economic well-being represented by preferences (3) and have access to labor and health care competitive markets. Once one of the parties P wins the elections, individuals who belong to different ability groups make labor decisions, n_P^j, at their wage level, w^j, obtaining net income equal to $z_P^j = w^j(1 - t_P)n_P^j + s_P^j$. Furthermore, the quality of health services under government P by group j could be supplemented at competitive price in private markets, $h_P^j = h_{gP}^j + h_{mP}^j$. The residual net income is devoted to the consumption of numeraire commodity, $c_{mP}^j = z_P^j - p_h h_{mP}^j$.

Furthermore, parties hold fixed and differentiated positions in some dimension non-related to economic policy such as ideological issues. Citizens care about these non-economic ideological issues

and have biases toward parties' positions.[7] Let σ_i be the relative attachment of citizen i to party B's positions (i.e. $\sigma_i = \sigma_{iB} - \sigma_{iA}$) which can be positive or negative. Idiosyncratic party attachments are unknown by political parties but group-specific distributions are common knowledge. Relative party attachments in group j are drawn from a uniform distribution over the range $[\sigma_a^j, \sigma_b^j]$ with average ideological attachment $\overline{\sigma}^j = (\sigma_a^j + \sigma_b^j)/2$ and density $\phi^j = 1/(\sigma_b^j - \sigma_a^j)$. The density measures the ideological heterogeneity within the group and therefore $\phi = \sum_{j=1}^{J} \mu^j \phi^j$ denotes the weighted average of ideological heterogeneity across groups. I assume that in the overall population there is no aggregate ideological bias and suppose that ideologically neutral voters, $\sigma_i = 0$, are present in all groups.

Citizens also care about political parties running in the elections. I assume that between the announcement of taxation and spending policies and the elections each party receives aggregate shocks, ε_A and ε_B, common to all voters in the population. I normalize the common shock, $\varepsilon = \varepsilon_B - \varepsilon_A$, which measures the relative popularity of party B with respect to party A at the time of elections. For simplicity, I assume that the common shock ε is uniformly distributed, and independently from σ_i, with density ψ and expected value, $E(\varepsilon)$, equal to 0.

$$\varepsilon \sim U[-\frac{1}{2\psi}, \frac{1}{2\psi}] \tag{14}$$

The timing of the political game is as follows: **1)** Political parties simultaneously and non-cooperatively credibly announce their taxation and spending policy platforms, $x_A = (t_A, \{s_A^j\}_{j=1}^J, \{h_{gA}^j\}_{j=1}^J)$ and $x_B = (t_B, \{s_B^j\}_{j=1}^J, \{h_{gB}^j\}_{j=1}^J)$. **2**) The random idiosyncratic, σ_i, and common popularity, ε, shocks are realized. **3)** Citizens vote for the party that they prefer, $\{A, B\}$. **4**) Whichever party P that obtains the majority of the votes, wins the election and implements the economic policy promised at the beginning of the game. Finally, **5)** individuals make labor and consumption choices through competitive markets, $\{c_{mP}^j, h_{mP}^j, n_{mP}^j\}_{j=1}^J$.

3.1 Stages of the Game

The political game presented above has three stages: economic policy announcements, elections and market decisions. I characterize the Subgame Perfect Nash equilibrium of the political game by backward induction.

3.1.1 Third Stage: Market Decisions

Once one of the parties, $P \in \{A, B\}$, wins the election, it is committed to implement economic policies, $x_P = (t_P, \{s_P^j\}_{j=1}^J, \{h_{gP}^j\}_{j=1}^J)$. Then, individuals within each ability group decide their labor effort, $\{n_P^j\}_{j=1}^J$, and whether making purchases of private health care, $\{h_{mP}^j\}_{j=1}^J$, with their net income, $\{z_P^j\}_{j=1}^J$. The residual net income is allocated to the consumption of numeraire com-

[7] In order to model individuals' concerns on non-economic issues, I use the partisanship stochastic probabilistic voting model proposed by Persson and Tabellini (1999). See Persson and Tabellini (2000) for a detailed discussion.

modity, $\{c^j_{mP}\}^J_{j=1}$. Therefore, the budget constraint of individuals who belong to ability group j under P's government is given by:

$$c^j_{mP} + p_h h^j_{mP} = w^j(1-t_P)n^j_P + s^j_P \equiv z^j_P \qquad \forall j \tag{15}$$

Hence, given income taxation and transfers policies under the government of party P, x_P, the choice problem for ability type θ^j individuals, who participate in the labor market, can be written as:

$$\max_{h^j_{mP}, n^j_P} \quad U^j(c^j, h^j, l^j) = u(w^j(1-t_P)n^j_P + s^j_P - p_h h^j_{mP}, h^j_{gP} + h^j_{mP}, 1-n^j_P) \quad \text{s.to.} \quad h^j_{mP} \geq 0 \quad \forall j \tag{16}$$

The optimal market choices, (h^{j*}_{mP}, n^{j*}_P), for individuals endowed with ability type θ^j must satisfy the FOCs for a maximum such that:

$$[h^j_{mP}] \qquad u_h + \gamma^j_h = p_h u_c \quad \forall j \tag{17}$$

$$[n^j_P] \qquad w^j(1-t_P)u_c = u_l \qquad \forall j \tag{18}$$

$$\gamma^j_h h^{j*}_{mP} = 0 \; ; \;\; \gamma^j_h \geq 0 \qquad \forall j \tag{19}$$

where γ^j_h is the multiplier associated to the non-negativity constraint, $h^j_{mP} \geq 0$. Depending on implemented economic policies, for each group j the choice problem (16) yields two alternatives. In the first alternative, elected government P levies income taxes and fund transfers such that the quality of health services publicly provided to group j, $h^j_{gP} > 0$, given available net income, z^j_P, is overprovided. Individuals would prefer to modify their current resource allocation by a reduction of one unit of the targeted resources through in-kind transfers compensated by a one unit increase in cash transfers. Therefore, when in-kind transfers are overprovided, individuals decide do not make purchases of health care, $h^{j*}_{mP} = 0$, and devote the net income obtained by their labor effort to the consumption of numeraire commodity, $c^j_{mP} = z^j_P$. The labor supply function of group j when there exists overprovision, $n^{j*}_P = n^j_P(p_h, w^j(1-t_P), s^j_P, h^j_{gP})$, is implicitly defined by:

$$w^j(1-t_P)u_c(z^j_P, h^j_{gP}, 1-n^{j*}_P) = u_l(z^j_P, h^j_{gP}, 1-n^{j*}_P) \qquad \forall j \tag{20}$$

where $z^j_P = w^j(1-t_P)n^{j*}_P + s^j_P$. Furthermore, overprovision in group j implies:

$$u_h(z^j_P, h^j_{gP}, 1-n^{j*}_P) < p_h u_c(z^j_P, h^j_{gP}, 1-n^{j*}_P) \qquad \forall j \tag{21}$$

Hence, given individuals' choices in competitive labor markets and targeted in-kind transfers and net income under the government of party P, the indirect utility function for ability type θ^j

individuals when their consumption of health care is overprovided (OV) is given by:

$$V_P^{jOV} \equiv V_P^j(p_h, w^j(1-t_P), s_P^j, h_{gP}^j) = u(w^j(1-t_P)n_P^{j*} + s_P^j, h_{gP}^j, 1-n_P^{j*}) \quad \forall j \text{ and for } P \in \{A, B\} \tag{22}$$

As an alternative, elected government could raise income taxes and allocate transfers such that the quality of health services publicly provided to group j, h_{gP}^j, given available net income, z_P^j, is either underprovided or enough-provided. Only when health care is underprovided individuals make private purchases in private markets, $h_{mP}^{j*} > 0$.[8] In this case, individuals market choices are identical to the case where group j would receive the market value of targeted in-kind transfers in terms of numeraire commodity. Then, let $I_P^j = s_P^j + p_h h_{gP}^j$ be the implicit cash transfers targeted to group j. The optimality conditions of individual's choice in group j yields:

$$u_h(z_P^j - p_h h_{mP}^{j*}, h_{gP}^j + h_{mP}^{j*}, 1-n_P^{j*}) = p_h u_c(z_P^j - p_h h_{mP}^{j*}, h_{gP}^j + h_{mP}^{j*}, 1-n_P^{j*}) \qquad \forall j \tag{23}$$

$$w^j(1-t_P)u_c(z_P^j - p_h h_{mP}^{j*}, h_{gP}^j + h_{mP}^{j*}, 1-n_P^{j*}) = u_l(z_P^j - p_h h_{mP}^{j*}, h_{gP}^j + h_{mP}^{j*}, 1-n_P^{j*}) \qquad \forall j \tag{24}$$

where $z_P^j = w^j(1-t_P)n_P^{j*} + s_P^j$ and $h_{mP}^{j*} \geq 0$. These conditions implictly define both the ordinary demand function for private health care, $h_{mP}^{j*} = h_m^j(p_h, w^j(1-t_P), I_P^j)$, and the labor supply function, $n_P^{j*} = n_P^j(p_h, w^j(1-t_P), I_P^j)$, for group j conditional to income taxation and transfers implemented by party P.

Given net income, targeted in-kind transfers and market choices in competitive markets under the government of party P, the indirect utility function for individuals with ability type θ^j whose consumption of health care is not overprovided (UN) is given by:

$$V_P^{jUN} \equiv V_P^j(p_h, w^j(1-t_P), I_P^j) = u(w^j(1-t_P)n_P^{j*} + s_P^j - p_h h_{mP}^{j*}, h_{mP}^{j*} + h_{gP}^j, 1-n_P^{j*}) \quad \forall j \text{ and for } P \in \{A, B\} \tag{25}$$

3.1.2 Second Stage: Voting

Citizens vote for the political party that they prefer given income taxation and spending policy proposals, their ideological biases and the popularity of parties. At the voting stage, individuals value economic policy platforms taking into account that they can make private decisions in competitive labor and health care markets. Therefore, individuals' valuation of income taxation and transfers policies are summarized by either indirect utility function (22) or (25) depending on whether quality of health care publicly funded is overprovided or not given the available income in group j implied by proposed policies.

Suppose that a member of group j is promised economic policies $x_A^j = (t_A, s_A^j, h_{gA}^j)$ by party A

[8] In the particular case where government targets in-kind transfers and net income to group j such that health care is enough provided, individuals do not supplement health care in private markets, $h_P^j = h_{gP}^j$. Individuals would be indifferent between a one unit reduction of in-kind transfers compensated by an increase in the targeted amount of cash transfers by the same amount of resources.

and $x_B^j = (t_B, s_B^j, h_{gB}^j)$ by B. Given ideological biases and the popularity of politicians, citizen i in group j votes for party A over B conditional on policy platforms (x_A^j, x_B^j) if:

$$V_A^j(x_A^j) > V_B^j(x_B^j) + \sigma_i + \varepsilon \tag{26}$$

where $V_P^j = \{V_P^{jOV}, V_P^{jUN}\} \ \ \forall j$ and for $P \in \{A, B\}$. While voting for party B if this inequality is reversed.

In each ability group, given proposed policy platforms, there might be citizens whose idiosyncratic ideological bias, σ^j, makes them indifferent between voting for party A and B. The swing voter type in each group j is defined as:

$$\sigma^j(x_A^j, x_B^j; \varepsilon) = V_A^j(x_A^j) - V_B^j(x_B^j) - \varepsilon \tag{27}$$

where $V_P^j = \{V_P^{jOV}, V_P^{jUN}\} \ \ \forall j$ and for $P \in \{A, B\}$. Voters who belong to group j with and ideological bias σ_i below (above) the cut-off ideological type find optimal to vote for A (B). I assume that a swing voter who is indifferent between both parties randomizes equally over the set of parties. Previously, I assumed that in each group the idiosyncratic ideological preferences are uniformly distributed. Furthermore, there does not exist an ideological bias to any of the parties in the overall population. Therefore, the overall vote share for party A is defined as:

$$S_A(x_A, x_B; \varepsilon) = \frac{1}{2} + \sum_{j=1}^{J} \mu^j \phi^j \sigma^j(x_A^j, x_B^j; \varepsilon) \tag{28}$$

The complement share of citizens votes for party B, S_B.

3.1.3 First Stage: Policy Announcements

At the first stage of the game, when politicians announce policy platforms, the common popularity shock has not been observed. The swing voter type in each group depends on both economic policy proposals and the realized value of the shock, $\sigma^j = \sigma^j(x_A^j, x_B^j; \varepsilon)$. Hence, parties are uncertain about the identity of pivotal voters in each group and voting is a random variable from politicians' perspective. Under majority voting, office-motivated politicians care about the probability of obtaining the support of more than half of the population. Given the definition of the swing voter type in each group (27) and distributional assumptions on ideological biases and popularity shock, the probability that party A wins the election can be expressed as:

$$P(x_A, x_B) = \frac{1}{2} + \frac{\psi}{\phi} \left[\sum_{j=1}^{J} \mu^j \phi^j \left[V_A^j(x_A^j) - V_B^j(x_B^j) \right] \right] \tag{29}$$

Party B anticipates winning the election with the complementary probability $1 - P(x_A, x_B)$. This probability function captures parties' uncertainty regarding electoral outcome and summarizes expected voting behavior of citizens given announced policies and implied market decisions.

Probabilistic voting introduces heterogeneity at citizens' voting decisions because of the presence of idiosyncratic party attachments. Thus, parties' expected number of votes are a smooth function of policy platforms. Furthermore, given that both group-specific distributions of ideological biases and individuals' utility functions are continuous, the probability of winning is a continuous function in both policy platforms. Moreover, this probability function is also strictly concave in party A's platform and strictly convex in party B's policy proposal. These properties are insured by assumptions on strict concavity of voters' utility functions and uniform distribution of ideological biases.[9]

Taking the opponent's policy choice problem as given, each political party chooses a linear tax over labor income and a combination of cash and in-kind transfers for each ability group, $x_P = (t_P, \{s_P^j\}_{j=1}^J, \{h_{gP}^j\}_{j=1}^J)$ for $P \in \{A, B\}$, that maximizes its chances of winning elections subject to government's budget constraint and non-negativity constraints. Parties take into account citizens' expected voting decisions (*stage 2*) and individuals' choices in competitive labor and health care markets (*stage 3*). Thus, the policy choice problem of party A is given by:

$$\max_{t_P, \{s_P^j\}_{j=1}^J, \{h_{gP}^j\}_{j=1}^J} \quad P(x_A, x_B) \quad \text{s.to.} \quad (13) \quad \text{and} \quad 0 \leq t_A \leq 1 \;\; ; \;\; s_A^j \geq 0 \;\; \forall j \;\; ; \;\; h_{gA}^j \geq 0 \;\; \forall j \tag{30}$$

Political party B makes policy announcements simultaneously. Its policy choice problem is symmetric to the one of party A.

4 Political Equilibrium

Definition: A Subgame Perfect Nash Equilibrium (SPNE) in the electoral competition game is i) a menu of income taxation and group-specific transfers announced by each political party P, $x_P^N = (t_P^N, \{s_P^{jN}\}_{j=1}^J, \{h_{gP}^{jN}\}_{j=1}^J)$; ii) a voting decision for each individual of the polity, $\{A, B\}$; and iii) individuals' private choices in competitive labor and health care markets under P's government, $\{c_{mP}^{jN}, h_{mP}^{jN}, n_P^{jN}\}_{j=1}^J$, such that:

1) Each political party commits to a policy proposal that maximizes its chances of winning elections subject to the government's budget constraint, taking into account both citizens' expected voting and market decisions and its opponent's policy choice problem.

2) Each citizen votes for the party that provides her with the maximum well-being given proposed economic policies, ideological biases, popularity shock and decisions in competitive labor and health care markets.

3) Each individual, given implemented economic policies by the winner party, chooses the labor effort and private health care services that maximize her well-being.

[9] See Persson and Tabellini (2000) for a discussion on the properties of objective functions in probabilistic voting games. Austen-Smith and Banks (2005) and Banks and Duggan (2006) provide a detailed technical argument on continuity and concavity properties.

In the electoral competition game with competitive markets, a SPNE in pure strategies exists and it is unique.[10] Furthermore, in this unique equilibrium, both parties propose the same income tax and distribution of cash and in-kind transfers across groups, $x_A^N = x_B^N = x^N$. This policy convergence follows because both parties make simultaneous policy announcements facing exactly the same policy choice problem. Both political parties aim to maximize their chances of winning elections constrained by the same taxation policy tools. Hence, regardless of which party wins the election, the electoral competition game implements the same allocation of resources once individuals make private choices in competitive markets, $\{c^{jN}, h^{jN}, n^{jN}\}_{j=1}^J$.

Furthermore, when parties commit to the same policy proposals, citizens' economic well-being would be the same under the government of either party A or B, $V^j(x_A^j) = V^j(x_B^j)\ \forall j$. Therefore, in equilibrium non-biased voters (i.e. $\sigma_i = 0$) in each group are expected to be indifferent between parties. Hence, politicians choose income taxation and transfers in order to court ideologically neutral voters who could swing their vote. I characterize equilibrium policies, $x^N = (t^N, \{s^{jN}\}_{j=1}^J, \{h_g^{jN}\}_{j=1}^J)$, when politicians undertake political redistribution.

4.1 Linear Income Taxation

Politicians need to raise income taxes in order to undertake political redistribution. Higher tax rates levied over labor income yield more revenue for redistribution. However, income taxation reduces voters' private utility and therefore raising taxes has a negative impact on parties' expected number of votes. Furthermore, taxes over earned income lead workers to reduce their labor effort. Therefore, these behavioral responses of workers decrease the endogenous pool of resources available for political redistribution. Hence, the size of the income tax choosen by politicians is limited by both its negative effect on chances of winning elections and individuals' adjustment of their labor effort.[11]

For both political parties, the equilibrium choice of income taxation satisfies the following relation:

$$\frac{t^N}{1-t^N} = -\frac{COV(\beta^j, y^j)}{\sum_{j=1}^{J} \mu^j y^j \varepsilon_{n,w}^{jc}} \tag{31}$$

where β^j is the net electoral marginal valuation of income in group j; y^j is the market income of individuals of group j; and $\varepsilon_{n,w}^{jc}$ is the group j's compensated labor supply elasticity.

This equation shows how various factors affect the equilibrium linear income tax choosen by political parties and it is close to the expression that results from the classical optimal income

[10] See Mathematical Appendix A for a formal discussion on the existence and uniqueness of the political equilibrium.

[11] See Mathematical Appendix B for a detailed characterization of the equilibrium linear income tax choosen by office-motivated political parties.

taxation problem with linear tax and uniform cash transfers.[12] I extend that framework allowing for group-specific transfers. Furthermore, now the implemented tax rate is not the optimal choice of a benevolent planner who aims to maximize social welfare. However, income tax rate is the equilibrium outcome of the electoral competition between office-motivated politicians. I discuss with some detail the different elements that affect the political choice of the income tax.[13]

Consider that politicians had available one unit of numeraire that could be targeted to whichever group j. Then, the net electoral marginal valuation of the income promised to individuals who belong to group j, β^j, is given by:

$$\beta^j = \frac{\psi \frac{\phi^j}{\phi} u_c}{\lambda} + t w^j \frac{\partial n^j}{\partial s^j} \tag{32}$$

The first term measures the marginal effect on parties' chances of winning by targeting an additional unit of numeraire commodity to a swing voter in group j. This contribution is normalized by the value of a unit of numeraire to politicians (*i.e.* it is converted in numeraire units dividing by the equilibrium shadow price of government revenue, λ). This marginal contribution depends on three elements: the marginal utility of consumption, u_c; the relative concentration of pivotal voters in group j with respect to the average concentration of swing voters in the overall population, ϕ^j/ϕ; and the uncertainty regarding the electoral outcome measured by the parameter ψ.

The second component captures the effect of behavioral responses of workers to cash transfers into government's revenues. In particular, asssuming that leisure is a normal good implies that an additional unit of numeraire targeted to a voter in group j reduces her labor effort. Therefore, per each unit of labor supply reduction there is a tw^j marginal cost of revenues.

Equation (31) shows that the larger the covariance between the net electoral marginal valuation and the market income in each group is, the greater the income tax rate announced by politicians. The magnitude of this covariance depends on the dispersion of y^j and β^j. Market income exhibits a higher dispersion when the distribution of abilities across groups is more unequal. The dispersion of β^j depends on both the relative concentration of swing voters among groups and the concavity of utility over consumption of numeraire.

Furthermore, income tax rate proposed by parties is larger when the compensated labor supply elasticities to changes in net wages of the groups are low. Compensated elasticities capture the inefficiencies introduced by income taxation and measure the income and tax revenues that are lost per unit of reduction in labor effort. Politicians consider the impact of these elasticities more relevant for groups with larger productivities and size because of the larger lost in tax revenues.

[12] See seminal work on optimal income taxation by Mirrlees (1971); Stiglitz (1987) and Kaplow (2008) for a discussion of the linear income tax case.

[13] The exposition of the results is close to Stiglitz (1987) and Kaplow (2008) in order to highlight both similarities and differences with optimal taxation literature in which governments are benevolent.

Hence, larger differences in the relative concentration of swing voters among groups; greater individuals' aversion to risk; higher inequality in the distribution of abilities across groups; and lower compensated labor supply elasticities contribute to a higher equilibrium tax rate which allows politicians to fund larger transfers.

Politicians do not have incentives to undertake political redistribution in the particular cases in which either the deadweight losses associated with income taxation are huge or there does not exist dispersion of y^j and β^j.[14] Nevertheless, I focus on the general case in which there exists dispersion in both productivity and concentration of pivotal voters among groups. Furthermore, efficiency costs of taxation are not excessive.[15]

4.1.1 Overprovision of Health Services

In equilibrium, political parties commit to a linear income tax and a combination of transfers such that the quality of health services publicly funded for each group, given their available net income, is overprovided. Overprovision implies:

$$u_h(z^{jN}, h_g^{jN}, 1 - n^{jN}) < p_h u_c(z^{jN}, h_g^{jN}, 1 - n^{jN}) \qquad \forall j \tag{33}$$

where the equilibrium net income is given by $z^{jN} = w^j n^{jN}(1 - t^N) + s^{jN}$, with $s^{jN} \geq 0$. Thus, politicians constrain individuals to consume more health services than they would buy in private markets if targeted resources were given in cash. Why do politicians who require the support of citizens to be elected might have incentives to overprovide the consumption of goods? The political reason relies on the fact that overprovision might increase the scope of political redistribution which is limited by distortions generated by income taxation.

In order to examine under which conditions there exists political incentives for in-kind redistribution, consider an economy in which both political parties do not overprovide health care. In that case, politicians announce the same set of policies which implies that health care publicly funded in all groups is either under or enough provided. Suppose that one party, for instance A, decides to modify its policy platform. In particular, for a given income tax, party A increases in-kind transfers targeted to group k reducing the funding of cash transfers. Suppose that the magnitude of the policy change involves that now in-kind transfers in group k are overprovided. What's the effect of this change in policy platforms on the economic well-being of non-biased voters in group k? I find that pivotal voters' well-being raises, $dV_A^k/dh_g^k > 0$, when the change in the composition of targeted transfers increases individuals' incentives to work.[16]

[14] For instance, politicians would not have incentives to redistribute when groups exhibit both the same productivity and concentration of non-biased voters. See Appendix B for additional details.

[15] See Salanié (2003) for a discussion on the efficiency cost of taxation and estimates of the compensated elasticities of labor supply.

[16] See Mathematical Appendix C for a technical proof that shows the conditions under which overprovision is a political equilibrium. The exposed procedure follows closely Gahvari (1994) who analyzes the effect of cash and in-kind transfers in labor supply and tax revenues when government is benevolent.

Workers raise their labor effort as long as leisure is a normal good and there exists complementarities betwen labor and the good subject to in-kind transfers, (i.e. $\partial l^{ck}/\partial h_g^k < 0$, where l^c is the compensated demand of leisure). The latter condition holds when either: i) preferences between leisure and goods subject to in-kind transfers are weakly separable, $\partial l^{ck}/\partial h_g^k = 0$; or ii) leisure and health are Hicks substitutes, $\partial l^{ck}/\partial p_h > 0$. The raise in labor effort enlarges aggregate labor income and therefore government's revenues for any level of income taxation. That increment of resources allows politicians targeting group k with larger in-kind transfers reducing targeted cash in a lower magnitude. Party A's change of policy platforms modifies the identity of expected swing voters in group k. Non-biased individuals and a share of voters with attachments to party B would be expected to vote for party A. Thus, this net gain in the expected number of votes provides incentives to modify the composition of redistributive transfers. Furthermore, these incentives are also present in the rest of the groups and therefore parties would deviate from the initial set of policy platforms. Thus, it is showed that either under or enough provision cannot be an equilibrium.

Hence, when there exists complementarities between labor and goods subject to in-kind transfers ($\partial l^{ck}/\partial h_g^k < 0$), politicians overprovide the consumption of these goods for all the population. The greater the complementarities are, the larger the rise in workers' labor effort and government's tax revenues to fund redistributive transfers. Therefore, politicians would have more incentives for overproviding these goods because it expands the scope of political redistribution which is limited by the disincentive effects created by income taxation.

4.1.2 In-Kind Transfers

In equilibrium, when political parties need to resort to in-kind transfers to compete for office, the publicly funded health care targeted to group j satisfies:

$$\frac{\frac{\psi}{\phi}\phi^j u_h(z^{jN}, h_g^{jN}, 1-n^{jN})}{\lambda^N} + t^N w^j \frac{dn^{jN}}{dh_g^{jN}} = p_h \qquad \forall j \tag{34}$$

where the equilibrium net income is given by $z^{jN} = w^j n^{jN}(1-t^N) + s^{jN}$, with $s^{jN} \geq 0$. Hence, for each group of voters, politicians equalize the marginal cost of funding in-kind transfers to their marginal political valuation. This valuation consists of both the marginal contribution of targeted in-kind transfers to parties' chances of winning and their marginal effect on tax revenues. Overprovision of goods increases incentives to work, $dn^j/dh_g^j > 0$, and therefore raises government's resources by tw^j per each additional unit of time devoted to work.

The electoral competition between politicians leads to a distribution of in-kind transfers across groups of voters that satisfies:

$$\frac{\phi^k u_h(z^{kN}, h_g^{kN}, 1-n^{kN})}{1-t^N w^k \frac{dn^{kN}}{dh_g^k}} = \frac{\phi^{k'} u_h(z^{k'N}, h_g^{k'N}, 1-n^{k'N})}{1-t^N w^{k'} \frac{dn^{k'N}}{dh_g^{k'}}} \qquad \forall k, k' \in \{1, ..., J\} \tag{35}$$

The interplay of three elements determine the equilibrium allocation of in-kind transfers among groups: i) the individuals' risk aversion over the consumption of the good subject to in-kind transfers; ii) the concentration of swing voters in the group; and iii) its level of productivity.

By concavity of utility function, politicians have incentives to transfer resources toward low ability groups because they exhibit higher marginal utility (i.e. lower market income). The larger the risk aversion is, the lower the groups' differences in the consumption of the good. Furthermore, politicians compete for pivotal non-biased voters who could swing their vote. Therefore, groups with larger concentration of non-biased individuals are favored in the allocation of in-kind transfers.

The effect of concavity and swing voters in the political allocation of transfers is well-known. Distributive politics points out how these factors affect the expected electoral returns of targeting transfers among groups (Lindbeck and Weibull, 1987; Dixit and Londregan, 1996). The novelty of this contribution relies on considering the effect of transfers on workers' incentives to work and government's revenues.

Income redistribution reduces workers' labor effort and therefore the tax basis to fund redistributive transfers. Previous section discusses under which conditions overproviding in-kind transfers might mitigate the disincentive effects of taxation. Furthermore, an extra unit of labor effort for high productivity groups generates more aggregate labor income and enlarges government's revenues for any level of taxation. Therefore, high productivity is a factor that contributes positively to receive larger in-kind transfers. Politicians have incentives to target high productivity groups with in-kind rather than cash to reduce tax losses generated by income redistribution. Nevertheless, the impact of this component on the targeted transfer depends on the groups' elasticities of labor supply to in-kind transfers.

4.2 Cash Transfers

Politicians can also undertake income redistribution through differential targeting of cash transfers among groups of voters. However, parties do not have incentives to target cash transfers to groups in which the net electoral marginal valuation of promising one unit of numeraire, β^j, is lower or equal than than the cost of the transfer.[17] Therefore, group j does not receive cash when:

$$\frac{\frac{\psi}{\phi}\phi^j u_c(w^j n^{jN}(1-t^N), h_g^{jN}, 1-n^{jN})}{\lambda^N} + t^N w^j \frac{dn^{jN}}{ds^j} \leq 1 \qquad \forall j \tag{36}$$

Otherwise, politicians promise cash transfers. In equilibrium, when group k is targeted with transfers, politicians equalize the marginal contribution of the transfer to their chances of winning, expressed in terms of numeraire, to its marginal cost. This cost consists of the direct effect of funding the transfer and the lost of tax revenues because of behavioral responses of workers. In

[17] See Mathematical Appendix E for technical details on necessary conditions for targeting cash transfers and equilibrium characterization of the distribution of transfers across groups of voters.

particular, cash transfers reduce labor effort through the income effect (*i.e.* $dn^j/ds^j < 0$). Hence, in equilibrium the cash transfer allocated to group k satisfies:

$$\frac{\frac{\psi}{\phi}\phi^k u_c(z^{kN}, h_g^{kN}, 1-n^{kN})}{\lambda^N} = 1 - t^N w^k \frac{dn^{kN}}{ds^k} \tag{37}$$

where the equilibrium net income is given by $z^{kN} = w^k n^{kN}(1-t^N) + s^{kN}$.

Furthermore, for any pair of groups targeted with cash transfers, k and k', the equilibrium relative allocation of transfers among groups is given by:

$$\frac{\phi^k u_c(z^{kN}, h_g^{kN}, 1-n^{kN})}{1 - t^N w^k \frac{dn^{kN}}{ds^k}} = \frac{\phi^{k'} u_c(z^{k'N}, h_g^{k'N}, 1-n^{k'N})}{1 - t^N w^{k'} \frac{dn^{k'N}}{ds^{k'}}} \tag{38}$$

The factors that affect the electoral incentives to redistribute among groups through cash are the same that the elements previously discussed for in-kind transfers. Groups with higher concentration of swing voters and lower productivities (i.e. higher marginal utility of consumption) exhibit larger electoral benefits of being targeted. On the other side, politicians must consider the differential impact on tax revenues of targeting cash transfers among groups with different productivities. Indeed, the cost of targeting cash transfers is greater for groups with larger productivities because of the decrease of their labor effort represents a larger loss of tax revenues per unit of labor supply reduction. Hence, politicians have incentives to target low rather than high productivity groups with cash in order to reduce income and tax revenues losses generated by political redistribution.

5 Normative Analysis

When politicians are constrained to raise revenues through income taxation, political redistribution generates allocative inefficiencies. Taxation over earned income introduces distortions in labor markets through the substitution effect reducing individuals' incentives to work. Indeed, the rate at which individuals are willing to trade leisure for consumption is lower than their competitive wage rate:

$$MRS_{l,c}^{jN} = w^j(1-t^N) < w^j \quad \text{for all } j \in \{1, ..., J\} \tag{39}$$

Furthermore, politicians implement redistributive policies that create distortions in goods markets. In fact, under the conditions previously discussed, the allocation of resources that results from the political process, $\{c^{jN}, h^{jN}, n^{jN}\}_{j=1}^J$, is such that the consumption of health care is overprovided for all individuals in the economy. Hence, in each income group, the rate at which consumers are willing to trade health care quality for numeraire commodity is lower than the rate at which the economy is able to transform numeraire into health care:

$$MRS_{h,c}^{jN} < MRT_{h,c} = q \quad \text{for all } j \in \{1, ..., J\} \tag{40}$$

Nevertheless, the feasibility of in-kind transfers reduces inefficiencies with respect to a situation

in which governments were able to redistribute only through cash transfers. By overproviding in-kind transfers, politicians introduce a friction in the consumption of goods. However, this distortion provides workers incentives to increase their labor effort with respect to a situation in which targeted transfers were given in cash. Therefore, it reduces the distortions in labor markets generated by income taxation. Overall, politicians choose redistributive schedules that increase the well-being of all individuals.

The increase in allocative efficiency can be showed as follows. The economic well-being of citizens when publicly funded health care is either under or enough provided is equivalent to the case in which the same amount of resources was targeted in cash.[18] Furthermore, I showed the conditions under which, for any level of income taxation, all individuals increase their well-being when health care is overprovided. In that case, politicians are able to raise in-kind reducing cash transfers in a lower magnitude. Hence**,** it is shown that voters can be made better off when politicians are able to redistribute income through in-kind transfers.

Thus, the allocation that results from the political game when in-kind transfers are available is Pareto superior to the case in which redistributive spending is restricted to cash transfers. Furthermore, the larger the complementarities between publicly funded goods and labor are, the greater the efficiency gains. Hence, the composition of redistributive spending choosen by politicians is not neutral in terms of efficiency.

Individuals work more and their consumption of health care is overprovided. However, citizens are better off with respect to a situation were only cash transfers were available because redistributive schedules enlarge their net income. Indeed, the equilibrium income tax is lower than the implemented tax rate when in-kind transfers are not feasible. On the one hand, the increase in labor effort raises the marginal utility of leisure, u_l. On the other hand, larger net income decreases the marginal utility of consumption, u_c. Therefore, the marginal rate of substitution between income and leisure for each group, $MRS_{l,c}$, is higher when in-kind transfers are feasible. In equilibrium, this marginal rate of substituion is equal to the net wage, $w^j(1-t^N)$. Hence, the net wage is larger with respect to a situation in which only cash transfers are available and therefore a lower equilibrium income tax rate is implemented. Thus, an economy where in-kind transfers are feasible exhibits lower distortions in labor markets with respect to a situation in which politicians were constrained to redistribute income only through cash transfers.

Normative analysis justifies the use of in-kind transfers to increase the efficiency of the taxation system. Literature relies on an important contribution due to Guesnerie and Roberts (1984) who show how forced consumption of goods which are complements to labor can made all individuals

[18] In the case that politicians do not overprovide consumption and target group j with in-kind transfers, h_g^j, these are equivalent to a cash transfer of value $I^j = p_h h_g^j$. Therefore, in this situation cash and in-kind transfers are equivalent in terms of individuals' well-being.

better off when the economy is in a second best because of the presence of distortions.[19] For the particular case in which the government is only able to levy linear taxes over labor income, Gahvari (1994, 1995) points out the welfare-enhancing role of in-kind transfers in an economy with uniquely two groups, the rich and the poor. Gahvari finds that government could decrease cash transfers and choose a uniform level of in-kind transfers that reduces distortions generated by income taxation. The funding of in-kind transfers results in overprovision (undeprovision) of goods for the poor (rich) that leads to an increase (decrease) of their labor effort. Overall, the government is able to enlarge its tax revenues and funds larger transfers that increase the welfare of all individuals.

However, why should elected politicians implement Pareto improving policies? This paper points out that when governments are elected by citizens they would have incentives to choose redistributive policies that minimize efficiency losses created by taxation. Nevertheless, it is important to notice that the reason is not a welfare improving goal of a benevolent government. Instead, politicians who strive to be elected propose redistributive schedules that enlarge the scope of redistribution which is limited by distortions. Politicians aims to enlarge resources to court pivotal voters who could swing their vote. Therefore, it is the competition for non-biased voters that leads politicians to choose policies that yield to constrained efficient allocations.

This efficiency result contrasts with a significant contribution by Epple and Romano (1996) in which in-kind transfers emerge as an inefficient tool of income redistribution. Instead, this paper shows that when income is the result of labor effort and policies modify individuals' incentives to work, redistribution through in-kind rather than cash might increase efficiency. Furthermore, the reduction of welfare losses attainable by the political mechanism analyzed in this paper are larger than efficiency gains explored in the normative literature. By exploiting probabilistic voting I can remove the constraint that transfers must be uniform. Once differential targeting of transfers is feasible, politicians can design redistributive schedules that increase labor effort of all individuals regardless of their productivity. Therefore, it provides larger reductions in the distortions introduced by income taxation.

These results show the potential role of electoral competition to increase allocative efficiency in economies which allocations of resources are the result of a political process. This idea was first raised by Wittman (1989,1995) who suggested it as an important feature of the competition between politicians who strive to be elected. Furthermore, few contributions have analyzed how the competition for pivotal citzens who could swing their vote improves efficiency. One exception is Besley (2007) who proposes a framework to analyze groups' influence on policy depending on individuals' attachments to parties. That set up is adopted by Besley, Persson and Sturm (2010) who showed how the competition for non-biased voters in the US states leads to pro-economic growth policies and efficiency gains. Another example in the literature is Lopez-Rodriguez (2010) who discusses the role of electoral competition for pivotal voters to achieve allocative efficiency in

[19] See Currie and Gahvari (2008) for an exhaustive review of the normative literature and a discussion on the role of in-kind transfers in second best economies.

the presence of market imperfections such as external effects.[20] In the current paper, I show how the competition for non-biased voters leads politicians to redistribute resources through tax-transfers schedules that minimize the efficiency cost of income taxation.

6 Conclusions

This paper investigates the scope of income redistribution when it is a political decision undertaken by elected politicians. The political incentives for redistribution are examined through an electoral competition model which provides interesting new insights. I first show that politicians have incentives to raise taxes and modify the market distribution of income to be elected. Nevertheless, when politicians are constrained to levy taxes on labor income the extent of political redistribution is limited by distortions and output losses created by income taxation. In order to mitigate these limitations, I show that politicians who compete for office might fund in-kind transfers and overprovide the consumption of goods which are complements to labor. This policy increases individuals' labor effort with respect to a situation in which only cash transfers are available. As a result, politicians extend resources for political redistribution which allows them to fund larger transfers to court pivotal voters.

An appealing contribution of this paper is its focus on the positive analysis of policymaking. I point out that the reason for redistribution and the characterization of redistributive schedules does not result from the optimal choice of a benevolent government who maximizes a normative criteria of social justice. However, it is the equilibrium outcome of a political process between politicians and voters. Furthermore, the normative properties of the political allocation are also suggestive. In spite of that redistribution through distortionary policy tools introduces inefficiencies, I find that political competition can be welfare improving. In particular, I show how the electoral competition for marginal voters who could swing their vote might improve the efficiency of the taxation system.

This paper extends the literature of distributive politics examining how the political allocation of transfers depends on the effect of redistribution on individuals' incentives to work. In particular, this paper provides a framework in which income is the result of labor effort, and politicians are constrained to raise revenues through distortionary taxation tools. This allows to analyze the trade-off faced by politicians between efficiency and political redistribution. Furthermore, I contribute to the literature examining the case in which not only cash but also in-kind transfers can be targeted across groups of voters. This gives interesting insights about how behavioral responses of workers to redistribution affect the composition of redistributive spending.

Some extensions of the proposed distributive politics framework with distortionary taxation are worthy to be considered for further research. As an example, I might allow for the possibility of

[20] Blomquist and Christiansen (1999) also point out the potential efficiency gains generated by political competition. In particular, they show how in the presence of both asymmetric information and tastes for redistribution toward low ability individuals, politicians that compete for office might implement policies that improve efficiency and reach distributive goals.

commodity taxation over the consumption of goods. For instance, politicians could also subsidize goods that are complements to labor in order to stimulate labor effort. This extension would permit us to analyze the effect of both price and quantity interventions on political redistribution.

Other venue for research would consist of analyzing how political redistribution affects the extensive margin responses of individuals in labor markets. I developed the case in which everyone participates into the labor market. However, empirical evidence shows that individuals responses to taxation policy are specially significant in the extensive margin (Eissa and Liebman, 1996). Indeed, literature has focused on designing optimal tax-transfers schedules that increase the incentives to participate in labor markets (Saez, 2002). Hence, it would be worthy to examine whether in-kind rather than cash transfers could provide incentives to participate in labor market. Furthermore, the implementation of these schedules should be rationalized not by the presence of benevolent governments but as the result of a political mechanism. Further research is necessary to analyze these extensions which might provide interesting new results.

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MATHEMATICAL APPENDIX

A. **EXISTENCE OF EQUILIBRIUM**

Proposition 1 *In the electoral competition game with competitive markets, a Subgame Perfect Nash Equilibrium exists and it is unique.*

Proof. [1] Given that i) the budget constraint of individuals who belong to ability group j under the government of any party $P \in \{A, B\}$ is defined by $c_m^{jP} + p_h h_{mP}^j = w^j(1 - t_P)n_P^j + s_P^j \equiv z_P^j$. Then, individuals' budget sets are non-empty, compact and convex for all ability groups in the economy; and ii) citizens' utility functions are assumed to be continuous and strictly concave in the consumption of numeraire, health care and leisure. Therefore, for any policy implemented by $P \in \{A, B\}$, individuals choose a unique bundle of private health care and labor supply.

[2] For each individual, parties' policy proposals, idiosyncratic ideological biases and popularity shocks imply different utility levels under the government of either party A or B. Then, every citizen votes for the party which yields him the maximum level of utility. When the utility level provided by each party is the same, indifferent individuals randomize equally over the set of candidates and vote for one of the parties.

[3] Given that for each political party i) the feasible set of strategies defined by the government's budget constraint is non-empty, compact and convex; and ii) the probability of winning elections is 1) continuous in both policy platforms, (x_A, x_B); and 2) strictly concave in x_P and strictly convex in x_{-P} for $P \in \{A, B\}$. Then, according to Glicksberg's Fixed Point Theorem, there exists a unique Nash Equilibrium in pure strategies in the first stage of the game.

Therefore, given [1], [2] and [3], in the political game there exists a Subgame Perfect Nash Equilibrium in pure strategies and it is unique. ■

B. **EQUILIBRIUM INCOME TAXATION**

Equilibrium policies are determined as the Nash Equilibrium of the first stage of the game in which both parties make simultaneous policy announcements. Taking the opponent's policy choice problem as given, each political party chooses a linear tax over labor income and a combination of cash and in-kind transfers for each group, $x_P = (t_P, \{s_P^j\}_{j=1}^J, \{h_{gP}^j\}_{j=1}^J)$ for $P \in \{A, B\}$, that maximizes its chances of winning elections subject to government budget constraint and non-negativity constraints. Parties take into account citizens' expected voting decisions (*stage 2*) and individuals' choices in competitive labor and health care markets (*stage 3*). Thus, the policy choice problem of party A results from the maximization of the following Lagrangean:

$$\mathcal{L}^A = \frac{1}{2} + \frac{\psi}{\phi}\sum_{j=1}^{J}\mu^j\phi^j\left[V_A^j(x_A^j) - V_B^j(x_B^j)\right] + \tag{41}$$
$$+\lambda_A\left[\sum_{j=1}^{J}\mu^j t_A w^j n_A^j - \sum_{j=1}^{J}\mu^j s_A^j - \sum_{j=1}^{J}\mu^j p_h h_{gA}^j\right] + \sum_{j=1}^{J}\mu^j\gamma_{sA}^j s_A^j + \sum_{j=1}^{J}\mu^j\gamma_{hA}^j h_{gA}^j$$

where λ_A is the Lagrange multiplier associated to the budget constraint. The policy choice problem of political party B is symmetric. There exists a unique equilibrium in which both parties propose the same income tax and distribution of cash and in-kind transfers across groups, $x_A^N = x_B^N = x^N$. Therefore, the First Order Conditions for both political parties evaluated at $x_A^N = x_B^N = x^N$ characterize equilibrium taxation and transfers policies:

$$[t] \quad \frac{\psi}{\phi}\sum_{j=1}^{J}\mu^j\phi^j\frac{dV^j(x^{jN})}{dt} + \lambda^N\left[\sum_{j=1}^{J}\mu^j w^j n^{jN} + t^N\sum_{j=1}^{J}\mu^j w^j\frac{dn^{jN}}{dt}\right] = 0 \tag{42}$$

$$[s^j] \quad \frac{\psi}{\phi}\mu^j\phi^j\frac{dV^j(x^{jN})}{ds^j} + \lambda^N\left[t^N\mu^j w^j\frac{dn^{jN}}{ds^j} - \mu^j\right] + \mu^j\gamma_s^{jN} = 0 \qquad \forall j \tag{43}$$

$$[h_g^j] \quad \frac{\psi}{\phi}\mu^j\phi^j\frac{dV^j(x^{jN})}{dh_g^j} + \lambda^N\left[t^N\mu^j w^j\frac{dn^{jN}}{dh_g^j} - \mu^j p_h\right] + \mu^j\gamma_h^{jN} = 0 \qquad \forall j \tag{44}$$

$$\lambda^N\left[\sum_{j=1}^{J}\mu^j t^N w^j n^{jN} - \sum_{j=1}^{J}\mu^j s^{jN} - \sum_{j=1}^{J}\mu^j p_h h_g^{jN}\right] = 0 \tag{45}$$

$$\gamma_s^{jN} s^{jN} = 0 \quad \forall j \quad ; \quad \gamma_s^{jN} \geq 0 \quad \forall j \tag{46}$$

$$\gamma_h^{jN} h_g^{jN} = 0 \quad \forall j \quad ; \quad \gamma_h^{jN} \geq 0 \quad \forall j \tag{47}$$

Individuals are at optimum before the introduction of policies, therefore by Envelope Theorem:

$$\frac{dV^j(x^{jN})}{dt} = -w^j n^{jN} u_c \quad ; \quad \frac{dV^j(x^{jN})}{ds^j} = u_c \quad ; \quad \frac{dV^j(x^{jN})}{dh_g^j} = u_h \tag{48}$$

Furthermore, using the Slutsky relation, the effect of income taxes on labor supply can be expressed as follows:

$$\frac{\partial n^j}{\partial t} = -w^j\frac{\partial n^{cj}}{\partial w^j} - w^j n^j\frac{\partial n^j}{\partial s^j} \tag{49}$$

Consider that politicians had available one unit of numeraire which could be targeted to group j. Then, the net electoral marginal valuation of income promised in group j, β^j, is given by:

$$\beta^j = \frac{\frac{\psi}{\phi}\phi^j u_c}{\lambda} + tw^j \frac{\partial n^j}{\partial s^j} \tag{50}$$

Adding over j the equilibrium FOC for group-specific cash transfers (43) and arranging terms gives:

$$\frac{\sum_{j=1}^{J} \frac{\psi}{\phi}\mu^j \phi^j u_c}{\lambda^N} + \sum_{j=1}^{J} \mu^j t^N w^j \frac{\partial n^{jN}}{\partial s^j} = 1 \tag{51}$$

Given the definition of β^j, equation (51) captures the equilibrium weighted average of the marginal electoral valuation of income across groups which can be expressed as:

$$\sum_{j=1}^{J} \mu^j \beta^j = 1 \tag{52}$$

Making use of (48) and (49), the equilibrium FOC for income tax (42) can be written as:

$$\sum_{j=1}^{J} \mu^j w^j n^j \left[\frac{\psi}{\phi}\phi^j u_c - \lambda \left[1 - tw^j \frac{\partial n^{cj}}{\partial w^j} \frac{1}{n^j} - tw^j \frac{\partial n^j}{\partial s^j} \right] \right] = 0 \tag{53}$$

Dividing by the shadow price of government revenue, λ, gives:

$$\sum_{j=1}^{J} \mu^j w^j n^j \left[\frac{\frac{\psi}{\phi}\phi^j u_c}{\lambda} + tw^j \frac{\partial n^j}{\partial s^j} - 1 + tw^j \frac{\partial n^{cj}}{\partial w^j} \frac{1}{n^j} \right] = 0 \tag{54}$$

Given the definition of the electoral marginal valuation of income in group j (50) and using (52), the equilibrium condition sastisfies:

$$\sum_{j=1}^{J} \mu^j w^j n^j \left[\beta^j - \sum_{j=1}^{J} \mu^j \beta^j + \frac{t}{1-t} \varepsilon_{n,w}^{jc} \right] = 0 \tag{55}$$

where $\varepsilon_{n,w}^{jc}$ is the compensated elasticity of labor supply defined as:

$$\varepsilon_{n,w}^{jc} = \frac{\partial n^{cj}}{\partial w^j} \frac{w^j(1-t)}{n^j} \tag{56}$$

Arranging terms, the equilibrium choice of income taxation satisfies the following expression:[21]

$$\frac{t}{1-t} = -\frac{COV(\beta^j, y^j)}{\sum_{j=1}^{J} \mu^j y^j \varepsilon_{n,w}^{jc}} \tag{57}$$

[21] The procedure to obtain the equilibrium relation follows closely Stiglitz (1987) and Kaplow (2008). However, I show how this expression arises as the equilibrium outcome of the electoral competition between politicians rather than from the optimal choice of a benevolent planner.

Furthermore, the equilibrium shadow price of revenue can be obtained solving for λ using (51):

$$\lambda^N = \frac{\sum_{j=1}^{J} \frac{\psi}{\phi} \mu^j \phi^j u_c}{1 - \sum_{j=1}^{J} \mu^j t^N w^j \frac{\partial n^{jN}}{\partial s^j}} \tag{58}$$

Therefore, the equilibrium net marginal electoral valuation of income promised to group j is given by:

$$\beta^j = \frac{\frac{\psi}{\phi} \phi^j u_c}{\sum_{j=1}^{J} \frac{\psi}{\phi} \mu^j \phi^j u_c} \left[1 - \sum_{j=1}^{J} \mu^j t^N w^j \frac{\partial n^{jN}}{\partial s^j} \right] + t^N w^j \frac{\partial n^{jN}}{\partial s^j} \tag{59}$$

Notice that the equilibrium market allocation would be a political equilibrium (i.e. parties propose do not undertake redistribution) if and only if this condition holds for all groups of the economy:

$$\frac{\frac{\psi}{\phi} \phi^j u_c(w^j n^{j*} - p_h h_m^{j*}, h_m^{j*}, 1 - n^{j*})}{\lambda} = 1 \qquad \forall j \tag{60}$$

Therefore, the following relation must hold for any pair of groups, k and k', of the economy:

$$\phi^k u_c(w^k n^{k*} - p_h h_m^{k*}, h_m^{k*}, 1 - n^{k*}) = \phi^{k'} u_c(w^{k'} n^{k'*} - p_h h_m^{k'*}, h_m^{k'*}, 1 - n^{k'*}) \tag{61}$$

This would be the case when all groups exhibit both the same productivity and concentration of pivotal voters.

C. **OVERPROVISION OF HEALTH SERVICES**

In equilibrium, political parties choose a combination of policies that overprovide the consumption of health services for all the population. In order to show this result, consider an economy in which both parties do not overprovide health services.[22]Suppose that one party, for instance A, deviates from the common policy announcement. In particular, for a given income tax, party A increases in-kind transfers targeted to group k reducing the funding of cash transfers. This change in policies involves that now in-kind transfers in group k are overprovided. What's the effect of this change on the economic well-being of non-biased voters in group k?

The indirect utility function of non-biased individuals in group k when party A overprovides health services is given by:

$$V_A^{kOV} \equiv V_A^k(p_h, w^k(1 - t_A), h_{gA}^k, s_A^k) = u(w^k(1 - t_A)n_A^{j*} + s_A^k, h_{gA}^k, 1 - n_A^{k*}) \tag{62}$$

[22]The logic and steps to proof the results follow closely Gahvari (1994, 1995) who analyzes the differentiated effect of uniform cash and in-kind transfers in labor supply and tax revenues of an exogenous government. Nevertheless, I work the case in which group-specific transfers are feasible and the government must be elected by citizens.

Totally differentiating (62) with respect to in-kind-transfers targeted to group k, yields:

$$\frac{dV_A^k}{dh_g^k} = \frac{\partial V_A^k}{\partial h_g^k} + \frac{\partial V_A^k}{\partial s^k}\frac{ds_A^k}{dh_{gA}^k} \tag{63}$$

The combination of policies proposed by political party A is constrained to satisfy its budget constraint given by:

$$\sum_{j=1}^{J} \mu^j s_A^j + \sum_{j=1}^{J} \mu^j p_h h_{gA}^j = \sum_{j=1}^{J} \mu^j t_A w^j n_A^j \tag{64}$$

For a given income tax rate, $t_A > 0$, totally differentiating party A's budget constraint with respect to in-kind-transfers targeted to group k and solving for ds_A^k/dh_{gA}^k yields:

$$\frac{ds_A^k}{dh_{gA}^k} = t_A w^k \frac{dn_A^k}{dh_g^k} - p_h \tag{65}$$

Thus, introducing the value of ds_A^k/dh_{gA}^k from (65) into (63) and arranging terms gives:

$$\frac{dV_A^k}{dh_g^k} = \left(\frac{\partial V_A^k}{\partial h_g^k} - p_h \frac{\partial V_A^k}{\partial s^k}\right) + \frac{\partial V_A^k}{\partial s^k} t_A w^k \frac{dn_A^k}{dh_g^k} \tag{66}$$

Party A departs from a situation in which the consumption of health care is not overprovided, therefore by Envelope Theorem:

$$\left(\frac{\partial V_A^k}{\partial h_g^k} - p_h \frac{\partial V_A^k}{\partial s^k}\right) = u_h - p_h u_c = 0 \tag{67}$$

Hence, the effect of the marginal change of transfers policy on economic well-being of non-biased voters, dV_A^k/dh_g^k, depends on the sign of dn_A^k/dh_{gA}^k.

The ordinary labor supply function of a worker who belongs to group k when there exists overprovision is given by:

$$n_A^{kOV} = n_A^k(p_h, w^k(1-t_A), h_{gA}^k, s_A^k) \tag{68}$$

Totally differentiating this labor supply function with respect to in-kind transfers targeted to group k, maintaining economic feasibility, yields:

$$\frac{dn_A^k}{dh_{gA}^k} = \frac{\partial n_A^k}{\partial h_g^k} + \frac{\partial n_A^k}{\partial s^k}\frac{ds_A^k}{dh_{gA}^k} \tag{69}$$

Given the value of ds_A^k/dh_{gA}^k from (65), equation (69) can be expressed as:

$$\frac{dn_A^k}{dh_{gA}^k} = \frac{\partial n_A^k}{\partial h_g^k} + \frac{\partial n_A^k}{\partial s^k}\left[t_A w^k \frac{dn_A^k}{dh_{gA}^k} - p_h\right] \tag{70}$$

Therefore, arranging terms yields:

$$\frac{dn_A^k}{dh_{gA}^k} = \frac{p_h\left[\frac{1}{p_h}\frac{\partial n_A^k}{\partial h_g^k} - \frac{\partial n_A^k}{\partial s^k}\right]}{1 - t_A w^k \frac{\partial n_A^k}{\partial s^k}} \tag{71}$$

Leisure was assumed to be a normal good, then $\partial n_A^k/\partial s^k < 0$. Therefore, the sign of the denominator of (71) is positive. In order to analyze the sign of the numerator, consider the ordinary demand function of leisure which is defined as the amount of time that individuals do not devote to work, i.e. $l^k = 1 - n^k$. The compensated demand of leisure conditional to policies promised by party A, l_A^{ck}, is obtained from the dual of the utility maximization problem that gives the ordinary demand of leisure under party A's government, l_A^k. Ordinary and compensated demand functions for leisure are related by the identity:

$$l_A^k(p_h, w^k(1-t_A), h_{gA}^k, s_A^k) \equiv l_A^{ck}\left[p_h, w^k(1-t_A), h_{gA}^k, V_A^k(p_h, w^k(1-t_A), h_{gA}^k, s_A^k)\right] \tag{72}$$

Differentiating (72) partially with respect to both cash and in-kind transfers to obtain:

$$\frac{\partial l_A^k}{\partial h_g^k} = \frac{\partial l_A^{ck}}{\partial h_g^k} + \frac{\partial l_A^{ck}}{\partial V_A^k}\frac{\partial V_A^k}{\partial h_g^k} \tag{73}$$

$$\frac{\partial l_A^k}{\partial s^k} = \frac{\partial l_A^{ck}}{\partial V_A^k}\frac{\partial V_A^k}{\partial s^k} \rightarrow \frac{\partial l_A^{ck}}{\partial V_A^k} = \frac{\partial l_A^k/\partial s^k}{\partial V_A^k/\partial s^k} \tag{74}$$

Introducing the value of $\partial l_A^{ck}/\partial V_A^k$ from (74) into (73) yields:

$$\frac{\partial l_A^k}{\partial h_g^k} = \frac{\partial l_A^{ck}}{\partial h_g^k} + \frac{\partial V_A^k/\partial h_g^k}{\partial V_A^k/\partial s^k}\frac{\partial l_A^k}{\partial s^k} \tag{75}$$

Substituting $(1 - n_A^k)$ for l_A^k and multiplying both sides of (75) by the inverse of the in-kind transfers unit cost yields:

$$-\frac{\partial n_A^k}{\partial h_g^k}\frac{1}{p_h} = \frac{1}{p_h}\frac{\partial l_A^{ck}}{\partial h_g^k} - \frac{\partial n_A^k}{\partial s^k}\frac{\partial V_A^k/\partial h_g^k}{\partial V_A^k/\partial s^k}\frac{1}{p_h} \tag{76}$$

Substracting $\partial n_A^k/\partial s^k$ from both sides and arranging terms gives:

$$\left[\frac{1}{p_h}\frac{\partial n_A^k}{\partial h_g^k} - \frac{\partial n_A^k}{\partial s^k}\right] = -\frac{1}{p_h}\frac{\partial l_A^{ck}}{\partial h_g^k} - \frac{\partial n_A^k}{\partial s^k}\left[1 - \frac{1}{p_h}\frac{\partial V_A^k/\partial h_g^k}{\partial V_A^k/\partial s^k}\right] \tag{77}$$

The first component of the RHS of (77) is positive when either preferences between leisure and the rest of the goods are weakly separable or leisure and health care are Hicks substitutes. On the one side, Gahvari (1994) shows that weakly separability of preferences and normality of leisure are enough to guarantee net substitutability, *i.e.* $\partial l^c/\ \partial h_g < 0$. This result holds in the current setting because given (75), when $\partial l_A^k/\ \partial h_g^k = 0$ and $\partial l_A^k/\ \partial s^k > 0$, we also obtain net substitutability:

$$\frac{\partial l_A^{ck}}{\partial h_g^k} = -\frac{\partial V_A^k/\partial h_g^k}{\partial V_A^k/\partial s^k}\partial l_A^k/\partial s^k < 0 \tag{78}$$

As an alternative, Neary and Roberts (1980) show that when leisure and the good subject to in-kind transfers are Hicks substitutes, i.e. $\partial l^{ck}/\partial p_h > 0$, then there also exists net substitutatibility, $\partial l^{ck}/\partial h_g^k < 0$.[23]

Furthermore, the second component of the RHS of (77) is negative. Indeed, party A overprovision of health care gives:

$$\partial V_A^k/\partial h_g^k < p_h \partial V_A^k/\partial s^k \rightarrow \frac{1}{p_h}\frac{\partial V_A^k/\partial h_g^k}{\partial V_A^k/\partial s^k} < 1 \rightarrow 1 - \frac{1}{p_h}\frac{\partial V_A^k/\partial h_g^k}{\partial V_A^k/\partial s^k} < 0 \tag{79}$$

Thus, given that leisure is a normal good, $\partial n^k/\partial s^k < 0$, we can obtain the sign of the effect of overprovision of in-kind transfers on labor supply (71):

$$\left[\frac{1}{p_h}\frac{\partial n_A^k}{\partial h_g^k} - \frac{\partial n_A^k}{\partial s^k}\right] > 0 \rightarrow dn_A^k/dh_g^k > 0 \tag{80}$$

Therefore, for a given income tax, when party increases in-kind transfers and reduces cash transfers in group k such that health services are overprovided, individuals have incentives to work more, $dn_A^k/dh_g^k > 0$, as long as there exists complementarities between labor and the good subject to transfers. It implies a change in the utility of pivotal voters:

$$\frac{dV_A^k}{dh_g^k} = u_c t_A w^k \frac{dn_A^k}{dh_g^k} > 0 \tag{81}$$

Hence, the change in policy platforms increases the economic well-being of non-biased voters in group k.

D. **EQUILIBRIUM IN-KIND TRANSFERS**

Consider the equilibrium FOC for in-kind transfers promised to group j, (44). I showed that the unique equilibrium involves overprovision of in-kind transfers for all groups (i.e. $h_g^{jN} > 0$ and then $\gamma_h^j = 0$ for all j). Therefore, the equilibrium condition for group j yields:

$$\frac{\frac{\psi}{\phi}\phi^j u_h(z^{jN}, h_g^{jN}, 1 - n^{jN})}{\lambda^N} + t^N w^j \frac{dn^{jN}}{dh_g^{jN}} = p_h \qquad \forall j \tag{82}$$

where the equilibrium net income is given by $z^{jN} = w^j n^{jN}(1 - t^N) + s^{jN}$, with $s^{jN} \geq 0$.

Furthermore, given the equilibrium condition (44), the equilibrium distribution of in-kind transfers across groups satisfies:

[23] See Gahvari (1994, 1995) for a detailed discussion of the results obtained by Neary and Roberts (1980).

$$\frac{\phi^k u_h(z^{kN}, h_g^{kN}, 1-n^{kN})}{1-t^N w^k \frac{dn^{kN}}{dh_g^k}} = \frac{\phi^{k'} u_h(z^{k'N}, h_g^{k'N}, 1-n^{k'N})}{1-t^N w^{k'} \frac{dn^{k'N}}{dh_g^{k'}}} \qquad \forall k, k' \in \{1, ..., J\} \tag{83}$$

E. EQUILIBRIUM CASH TRANSFERS

Consider the equilibrium FOC for cash transfers targeted to group j,(43). This equilibrium condition shows that group j does not receive cash transfers when:

$$\frac{\frac{\psi}{\phi}\phi^j u_c(w^j n^{jN}(1-t^N), h_g^{jN}, 1-n^{jN})}{\lambda^N} + t^N w^j \frac{dn^{jN}}{ds^j} \leq 1 \qquad \forall j \tag{84}$$

Otherwise, parties promise cash transfers. In equilibrium, politicians target cash transfers to group k such that the net electoral marginal valuation of income, β^{kN}, is equal to the direct cost of lump sum cash transfers:

$$\beta^{kN} \equiv \frac{\frac{\psi}{\phi}\phi^k u_c(z^{kN}, h_g^{kN}, 1-n^{kN})}{\lambda^N} + t^N w^k \frac{dn^{kN}}{ds^k} = 1 \tag{85}$$

where the equilibrium net income is given by $z^{kN} = w^k n^{kN}(1-t^N) + s^{kN}$.

Furthermore, given the equilibrium condition (43), for any pair of groups targeted with cash, k and k', the equilibrium relative allocation of transfers is given by:

$$\frac{\phi^k u_c(z^{kN}, h_g^{kN}, 1-n^{kN})}{1-t^N w^k \frac{dn^{kN}}{ds^k}} = \frac{\phi^{k\prime} u_c(z^{k'N}, h_g^{k'N}, 1-n^{k'N})}{1-t^N w^{k'} \frac{dn^{k'N}}{ds^{k\prime}}} \tag{86}$$