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September 2009

Are public policies effective in alleviating family income inequality in Iran?*

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Abstract

Redistributing incomes has always been one of the main goals of Iranian policy makers, although political regimes have changed frequently between 1991 and 2004. We have applied a microsimulation using the Oaxaca-Blinder decomposition and a Heckman correction for sample selection bias to compare simulation results for a hypothetical unchanged situation with the actual policy shift observed. While we are able to identify the years in which policy shifts occurred, our results suggest that the intended redistribution goals were at most partially achieved, affecting only some occupations and being offset by changes to the level of family incomes.

Keywords: Income Distribution, Policy Evaluation, Oaxaca-Blinder, Heckit.

1 Introduction

Following the end of the Iran-Iraq war in 1988, equalizing incomes across classes became one of the main goals pursued by Iranian governments as expressed in the framework of three development programs implemented from 1990 through 2004. The first development program began in 1990 and continued untill 1994 while Mr. Rafsanjani was president. The goals of this program were a reform in the economic structure, control of population growth and promotion of social justice through the redistribution of wealth, decreasing the gap between rich and poor, and balancing the wages and incomes of various economic sectors. Deregulation was one of the main characteristics of the economic policy under the first half of the Rafsanjani presidency.

*Forthcoming in Journal of Income Distribution.

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The second development program began in 1995, when the Rafsanjani government returned to its previous price regulation policies, and continued untill 1999. This program's first guideline was "the realization of social justice"; as such it defined the Gini coefficient as the criterion for income inequality and set decreasing the value of this coefficient as the main goal of the program. In addition to these social justice goals, this program also included plans for privatization, reform of the tax system, extension of the social security system, and reduction of the country's dependence on income from oil exports. This program also proposed reforming wages and the "salary payment system".

The third development program, introduced in 2000, was designed with the aim of increasing privatization and minimizing government intervention in the economy. Moreover, as in both previous programs, reducing income inequality was set as a further important goal. This program also defined certain instruments such as the social security and insurance systems as a means of promoting social justice.

Reviewing the goals of all these three programs indicates that improving the equity of income distribution was constantly one of the central goals that led Iranian policy makers in determining overall policies for the economy of Iran. This raises a question, aside from consideration of the various aspects of pushing distributive policies, and that is to what extent these different policies implemented from 1990 to 2004 met the goals stated above. It should be noted that, since improving distributions solely for certain occupations is not sufficient proof of a general change, we focus on the effect of distributional polices at the family level in addition to their effects on all occupations; this is because, sometimes the government distributes wages more equitably, but in transferring this effect to the level of the family, it fails, since the effects of the policy on other factors offset the effects on wages.

In this paper, we demonstrate how policy shifts between 1991 and 2004, affect income flows in different occupations and integrate this to the family level; based on these results, we evaluate the effectiveness of policy measures on income distribution during that period. We follow an Oaxaca-Blinder (1973) microsimulation framework as extended by Bourguignon et al. (2004); moreover, we use Heckman's correction method in successive years to capture sample selection bias. This method helps us evaluate the effects on the distribution that policy shift has caused in comparison to the hypothetical case without the occurrence of the policy shift.

The microsimulation methodology used in this paper is a very simple dynamic single-country model that may be seen as an extension of the well-known Oaxaca-Blinder decomposition. In our microsimulation, the effect of the policy shift is obtained by comparing the actual and the hypothetical distribution obtained by a simulation of the population observed at the current period and the remuneration structure observed during the previous period. Since our objective is to compare a society affected by a policy shift with a society unaffected by that shift, we face a sample selection bias in applying this method, because there is no data for the various economic actors and the income level in the hypothetically unaffected year. As the characteristics of the unaffected society, we choose to use the remuneration structure of the year before the shift happens, and this assumption of two successive years alleviates the problem of structural changes but cannot resolve it.

Heckman's (1976) method for capturing sample selection bias is used in this paper in order to capture the endowment effect in the Oaxaca-Blinder decomposition. Velez, et al. (2002) and Bravo, et al. (2000) have used Heckman's method in studies of income distribution, but in their application for describing participation of women in the labor force, Heckman's method does not have any significant effect on the prediction power "[p]ossibly because of the lack of proper instruments, the correction for selection proved insignificant" (Bourguignon, et al. (2004, p. 189)). We, on the other hand, use the significant power of Heckman's two-stage method to predict the hypothetical year that is unaffected by policy shifts. Our method regards previous methods as special cases and adds an instrument for capturing sample selection bias, given that there is no data for the hypothetical year.

The organization of this paper is as follows: in section 2, we discuss our model; the empirical results are presented in section 3; section 4 illustrates our conclusions.

2 Model

The first component of our model is an identity that defines income per capita in household h with n_h members and three activities:

$$y_h = \frac{1}{n_h}\left[\sum_{j=1}^{3} I_h^j.Y^j + y_h^o\right] \tag{1}$$

in which Y^j is series of an individual's income in activity j, and the inner product $I_h^j.Y^j$ aggregates earnings of those individuals who belong to household h; the definition of I_h^j is a dummy variable, *one* when corresponding element of Y^j belongs to a person in household h, and is otherwise *zero*. In expression 1, household income is defined as the aggregation of earnings Y^j for those individual members of household h across activities j, and of other sources of household income y_h^o.

An individual i earns, in activity j, an income y_i^j which depends on his or her socio-economic characteristics; likewise, y_h^o, other sources of household income depends on household specific characteristics. We replace the density function with the linear model; the following equations show this relation:

$$\log(y_h^o) = X_h^o \beta^o + \varepsilon_h^o \tag{2}$$

$$\log(y_i^j) = X_i^j \beta^j + \varepsilon_i^j \qquad j = 1, 2, 3 \tag{3}$$

There are thus four equations: the last three equations (2) and (3), for individual activities and the equation for other sources of household income; they will be integrated into (1). Thus this model will present a complete relation between family income, characteristics and the family members, such that we can use this model in a microsimulation. However, in this model we do not control for occupational choices. In the next step, we develop this model further in order to compare two given situations. Without loss of generality, the rest of this section will be considering one of the mentioned four equations.

2.1 Microsimulation

The essence of notation in this section is like that of Bourguignon, et al. (2004, chapter 2, page 19), however, the difference is the fact that in their notation t, and t' specify two time periods but we think of two situations s, and s': an affected and a hypothetically unaffected situation from a policy shift that occurs in time period t, a year we refer to as "*this year*"[1]. Let $f^s(y)$, and $f^{s'}(y)$ be the density functions of the distribution of income y, or any other definition of economic welfare, at two mentioned situations s, and s'. The

[1] Here, we assume that we know when the policy shifts. However, tracing this fact is case dependent; in our application we define a measure for the amount of policy shift in different years and match it to economic facts. For more description please see section 3, empirical results.

objective of the analysis is to identify the effective factors in the change of the distribution from the second to the first distribution: a hypothetical unaffected situation s' to an affected situation s from the policy shift in this year.

To do so, Following Bourguignon, et al. (2004, p. 27), we depart from the joint distributions $\varphi^s(y, X)$, where X is a vector of individual or family characteristics. The distribution of incomes, $f^s(y)$, is of course the marginal distribution of the joint distribution $\varphi^s(y, X)$:

$$f^s(y) = \int ... \int_{c(X)} \varphi^s(y, X)dX \tag{4}$$

where the integral is over the domain $c(X)$ on which X is defined. Denoting $g^s(y|X)$, the distribution of income conditional on X, an equivalent expression of the marginal income distribution at situation s is:

$$f^s(y) = \int ... \int_{c(x)} g^s(y|X)\chi^s(X)dx \tag{5}$$

where $\chi^s(X)$ is the joint distribution of all elements of X at situation s. We can write this distribution for situation s' as well.

Given the elementary decomposition, it is a simple matter to express observed distributional change from $f^{s'}(y)$ to $f^s(y)$ as a function of the change in the two distributions appearing in (5) – that is to say, the distribution of income conditional on characteristics X, $g(y|X)$, and the distribution of these characteristics, $\chi(X)$. To do so, Bourguignon, et al. (2004) define the following counterfactual experiment:

$$f_g^{s'\to s}(y) = \int ... \int_{c(x)} g^s(y|X)\chi^{s'}(X)dx \tag{6}$$

The distribution would have been observed at situation s' if the distribution of income conditional on characteristics X had been that observed in situation s. Likewise, we may define the counterfactual

$$f_\chi^{s'\to s}(y) = \int ... \int_{c(x)} g^{s'}(y|X)\chi^s(X)dx \tag{7}$$

where, this time, it is the joint distribution of characteristics that has been modified. Note that this latter distribution could also have been obtained starting from the situation s and replacing the conditional income distribution of that situation by the one observed in situation s'. In other words, it is identically the case that, with obvious notation,

$$f_g^{s\to s'}(y) = f_X^{s'\to s}(y) \tag{8}$$

On the basis of the definition of these counterfactuals, the effect of policy shift $f^s(y) - f^{s'}(y)$ may now be identically decomposed into

$$f^s(y) - f^{s'}(y) = \left[f^s(y) - f_g^{s\to s'}(y)\right] + \left[f_X^{s'\to s}(y) - f^{s'}(y)\right] \tag{9}$$

taking means under the parametric assumption that the conditional mean of $g^s(y|X)$ may be expressed as $X\beta^s$ would actually lead to the well known Oaxaca-Blinder decomposition:

$$\overline{y^s} - \overline{y^{s'}} = \overline{X^s}(\beta^s - \beta^{s'}) + (\overline{X^s} - \overline{X^{s'}})\beta^{s'} \tag{10}$$

which is the actual equation Bourguignon et al. (2004) present on pages 21 and 29 of their book. The observed distributional change in (9) is expressed as the sum of a price-behavioral effect and an endowment effect.

Now suppose ideally that we have characteristics and incomes of individuals and families in both situations s and s'. In a simple way of performing without considering general functional problem, we replace the density function by following model in both situations s and s':

$$\log(y_i^s) = X_i^s\beta^s + u_i^s \tag{11}$$

$$\log(y_i^{s'}) = X_i^{s'}\beta^{s'} + u_i^{s'} \tag{12}$$

in which y_i^s, and X_i^s are individual or family i's income and characteristics in situation s, and likewise in situation s'. Using equations (11) and (12), we may write the identity of decomposing the effect of the policy shift for individual or family i as:

$$\widehat{\log(y_i^s)} - \widehat{\log(y_i^{s'})} = X_i^s(\beta^s - \beta^{s'}) + (X_i^s - X_i^{s'})\beta^{s'} \tag{13}$$

This expression decomposes the change from the policy shift for an individual or family i into two separate coefficient and endowment effects. Equation (9) refers to full distribution and equation (13) is for an assumed individual or family i.

As mentioned above, our objective is to compare a year which is affected by a policy shift with the same year which is not affected by that shift. Indeed, the intention of this paper is using the data from *"previous year"*, the year $t-1$, to find some indicators that signal for the hypothetical unaffected year e.g., the indicator we could use for the coefficients $\beta^{s'}$ is that of the same model in the previous year. While we can capture the coefficient effect following the procedures of Oaxaca (1973), Blinder (1973), and Bourgouignon et al. (2004), the procedure has serious limitations in capturing the endowment effect in our objective. The reason that induces us to include the second term in equation (13) using another convenient term to consider the endowment effect is that, if a change has occurred in the characteristics of some group in two successive years, it may arise from the fact that people do not cease improving in certain characteristics when this is already in progress. For instance, educational improvement in society may not be an effect of policy shifts. Overall, we want to create a density function for a notional period that has not ever really occurred, which is why we have a sample selection bias. For this we use Heckman's model which helps us to consider endowment effects, or structural changes of a simulated year, in addition to accessible coefficient effects.

In our microsimulation, we start by comparing the actual distribution in this year and the hypothetical distribution obtained by simulating the population observed again in this year but using the previous year's coefficients. Indeed, to alleviate the problem of the endowment effect, we analyzed two successive years; in addition, we use Heckman (1979) to capture sample selection bias. Doing this, the first "Heckit" equation for the hypothetical unaffected situation s' could be the equation (11) with the data from the previous year $t-1$,

$$\log(y_i^{t-1}) = X_i^{t-1}\beta^{t-1} + u_i^{t-1} \qquad i = 1, ..., N' \tag{14}$$

Then we need the second Heckit equation, for which we merge two databases of this year and previous year. Here, in fact we constitute the situation s' using the data from the previous year because the situation s' would have the same structure of that year in transition to this year if the policy shift had not occurred. Our second Heckit equation is:

$$D_i^{t,t-1} = X_i^{t,t-1}\beta^{t,t-1} + U_i^{t,t-1} \qquad i = 1, ..., N + N' \tag{15}$$

$X_i^{t,t-1}$s are the variables from our merged database, which determine the probability of the existence of an individual or family with a specific socio-demographic characteristic and income in previous year, and $D_i^{t,t-1}$ is a dummy variable, which is defined as follows:

$$D_i^{t,t-1} = \{ \begin{array}{ll} +1 & if\ date\ of\ \ X_i^{t,t-1}\ is\ t-1,\ previous\ year \\ -1 & if\ date\ of\ \ X_i^{t,t-1}\ is\ t,\ this\ year \end{array} \tag{16}$$

Based on definitions in 15 and 16, $D_i^{t,t-1} > 0$ or $U_i^{t,t-1} > -X_i^{t,t-1}\beta^{t,t-1}$ is for the case in which we have our desired data and obviously is unaffected by the policy shift because it belongs to the previous year. On the other hand, when we have a negative $D_i^{t,t-1}$ is when we would like to have some data from unaffected situation s' in this year but we do not. However, for a negative $D_i^{t,t-1}$ we use our second Heckit equation to correct for the fact that we do not have the desired data. Equation (14) helps us to create Mill's Ratio as in Heckman (1979):

$$z_i = -X_i^{t,t-1}\beta^{t,t-1} \qquad i = 1, ..., N + N' \tag{17}$$

$$\lambda_i = \frac{\phi(z_i)}{1-\varphi(z_i)} = \frac{\phi(z_i)}{\varphi(-z_i)} \qquad i = 1, ..., N + N' \tag{18}$$

where ϕ and φ are, respectively, the density and distribution function for a standard normal variable. In the next step, we separate the data for inverse of Mill's ratio, λ_i, for previous year and add it to regressors of equation (14) to run the second stage Heckit equation for the previous year, which can now be referred to as unaffected situation s':

$$\widehat{\log(y_i{}^{s'})} = x_i^{t-1}\widehat{\Omega^{s'}} + \lambda_i^{t-1}\widehat{\alpha^{s'}} \qquad i = 1, ..., N' \tag{19}$$

Using Mill's ratio we can disentangle those effects on income which come from current characteristics from those effects which come from the change in characteristics prior to the policy shift. In fact, Mill's ratio transits previous year hypothetically to a time period between the previous year and this year under the condition that no policy shift has occurred. Likewise, we could start from year t, in equation (14) with superscript t, and find the affected situation s in the time period between the previous year and this year:

$$\widehat{\log(y_i{}^{s})} = X_i^t\widehat{\Omega^{s}} + \lambda_i^t\widehat{\alpha^{s}} \qquad i = 1, ..., N \tag{20}$$

As mentioned above in (19) and (20) we think Mill's ratio puts our model hypothetically in a situation where both characteristics from previous year and this year belong to a time period between the previous year and this year but the former is unaffected and the latter is affected, so that we can say that endowment effects are automatically controlled.

Consequently, we can substitute parameters of the equation in the affected situation s with that of unaffected situation s', and compare both affected and unaffected income structures from the policy shift as follows:

$$\log(\widehat{y_i{}^{hypothetical\ s'}}) = X_i^t \widehat{\Omega^{s'}} + \lambda_i^t \widehat{\alpha^s} \qquad i = 1, ..., N \tag{21}$$

$$\Delta_i^t = \widehat{\log(y_i{}^s)} - \log(\widehat{y_i{}^{hypothetical\ s'}}) = X_i^t (\widehat{\Omega^s} - \widehat{\Omega^{s'}}) \qquad i = 1, ..., N \tag{22}$$

This equation actually corresponds to equation (13) and Δ_i^t is the amount of change in individual or family i's earnings as a result of the policy shift in this year.

Finally, we specify Δ_i^t in deciles with respect to income to compute the effect of the policy shift on an average person or family in each decile, i.e., the effect of policy shift in year t on a middle class in decile j is:

$$EFFECT_j^t = \frac{\sum\limits_{i=[0.1\times N]\times(j-1)}^{[0.1\times N]\times j} \Delta_i^t}{[0.1 \times N]} \qquad j = 1, ..., 10 \tag{23}$$

in which Δ^t is sorted with respect to earnings in year t. Analyzing these ten results requires special rules and is also severely state dependent, depending on the state of the economy under consideration. We find, however, that any policy being successful in reducing income inequality is reflected in a decreasing order that is $EFFECT_j^t$ is decreasing in j.[2]

3 Empirical Results

The Statistical Center of Iran (SCI) has been gathering data on the socioeconomic characteristics of households in Iran since 1963. This data consists of all socioeconomic characteristics of a sampling of Iranian households drawn each year. We use fourteen series of the data from 1991 to 2004 to model the four equations in (2) and (3) which constitute (1). Given Iranian data definitions, individual incomes may come from three activities: wage earning, business activity, and other kinds of transfer. In addition, we use households'

[2]Inflation does not affect the slope of differences in income with respect to deciles, because using logarithms in addition to CPI adjustments of the previous year's income to the year under consideration changes only the levels in Figure 2.

consumption subtracted from earnings of family members as an indicator for other sources of households' income.[3]

In our calculations over this fourteen year period we intend to identify the occurance of a policy shift by determining a change in the remuneration structure of society. In order to do this, we assume that a policy shift has a direct impact on the remuneration structure. Following this idea, we use a Wald test to compare parameters of the equations for two successive years. In doing so, we average probabilities of equality of the corresponding parameters of the four equations, in (2) and (3), in the two successive years t and $t-1$:

$$rr_{t-1,t} = \frac{1}{K}\left(\sum_{j=1}^{3}\sum_{k=1}^{K_j}\Pr(\beta_k^{j,t} = \widehat{\beta_k^{j,t-1}}) + \sum_{k=1}^{K_o}\Pr(\beta_k^{o,t} = \widehat{\beta_k^{o,t-1}})\right) \tag{24}$$

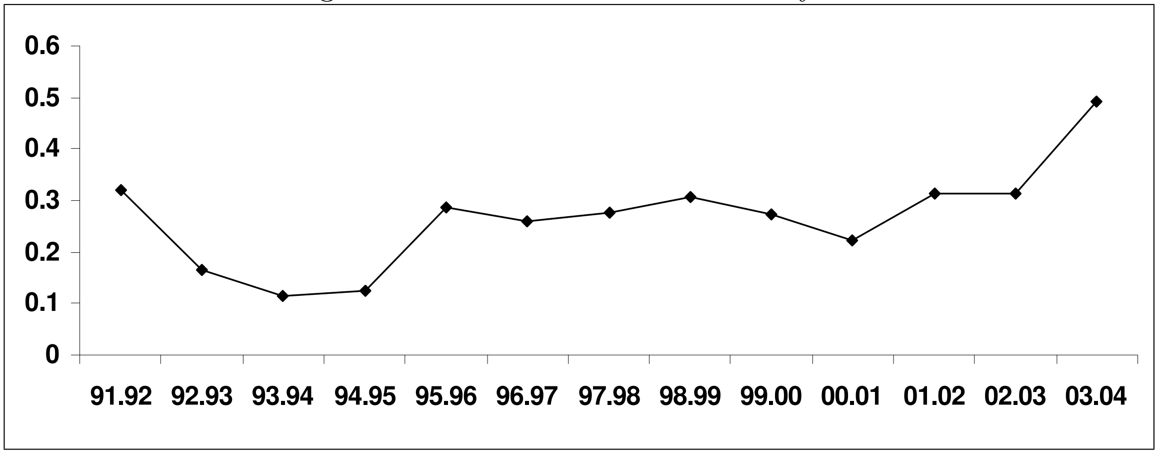
In this definition K_j and K_o represent the numbers of variables used in X for the j^{th} equation in (3) and equation (2), $K = \sum_j K_j + K_o$, and superscripts t and $t-1$ characterize coefficients for the respective year. We call this ratio the "resemblance ratio". Resemblance ratio is our measure of the amount of the policy shift such that the greater this ratio is, the more similar the coefficients in the two years are. We interpret this as less policy shift occurrence. Conversely, this measure can be used to identify years in which substantial changes in the remuneration structure occured at local minima with respect to years.

We calculate the resemblance ratio of all 14 years as portrayed in Figure 1. Four years show a reduction from previous and following years, since they are four local minima. This fact indicates that the familial remuneration mechanism is more affected in the years 1994, 1997, 2001, and 2003, changes which were probably related to the return to previous price regulations in the second half of the Rafsanjani presidency, the beginning of the first half of the Khatami presidency, the beginning of the third development program, and a policy break in the second half of the Khatami presidency, respectively. In the next subsection, we have also considered the years 1995 and 1998 whose resemblance ratios are relatively at the same levels as previous years.

The regression results for 1994, which showed the greatest policy shift, based on the resemblance ratio, are shown in Table 1. For calculating Mill's ratio, named LANDA, the data for year 1993 are also used. We have controlled for inflation by adjusting the

[3] Please see Appendix for a description of the data and definitions in this survey in addition to the way we have aggregated this data.

Figure 1: Resemblance Ratios for 14 years



earnings and spending of the year 1993 to the target year 1994 by the inflation rate in that target year. This table is useful for clarifying how the regression for equations of these four activities of a family is run. After merging the databases of two years and calculating Mill's ratio, we redo all regressions while adding Mill's ratio to the regressors. Finally, we substitute coefficients and evaluate effects on different income deciles as we did in (22), and (23).

Table 1: Equations for year 1994

		Variables											
	Stage	Intercept	EMN	M	GE	AGE	EDU	P	EMST	FSIZE	LTY	LANDA	Adj-usted R^2
Entrepreneurs	1	15.491	0.209		-1.197		-0.321	0.735	-0.123				0.207
		(0.067)	(0.016)		(0.036)		(0.023)	(0.024)	(0.025)				
	2	-40.785	0.175		-1.093		-0.255	5.570	-0.116			39.848	0.341
		(1.171)	(0.014)		(0.033)		(0.021)	(0.102)	(0.023)			(0.828)	
Wage Earners	1	14.919		-0.175	-0.265	0.016	-0.573	0.422	-0.317				0.264
		(0.044)		(0.007)	(0.023)	(0.000)	(0.021)	(0.016)	(0.012)				
	2	101.466		-0.077	-0.038	0.109	-5.509	-6.686	-0.245			-55.225	0.663
		(0.673)		(0.005)	(0.015)	(0.000)	(0.040)	(0.056)	(0.008)			(0.429)	
Other transfer recipients	1	13.214		-0.021	-0.179	0.013	-0.489	0.884	-0.021				0.253
		(0.072)		(0.012)	(0.036)	(0.000)	(0.034)	(0.031)	(0.012)				
	2	-38.251		-0.481	-0.122	0.011	4.166	4.495	-0.481			28.826	0.429
		(1.251)		(0.015)	(0.032)	(0.000)	(0.116)	(0.092)	(0.015)			(0.699)	
Other sources of household income *	1	14.251				0.006	-0.191			0.101	-0.114		0.031
		(0.338)				(0.001)	(0.048)			(0.008)	(0.023)		
	2	9.759				0.003	-0.500			0.047	-0.230	6.631	0.386
		(0.288)				(0.001)	(0.039)			(0.007)	(0.018)	(0.147)	

Note: all parameters significant at 5%
- Independent variable is logarithm of income in corresponding group
-EMST is the employment status that the individual has, M is one's membership in family, GE is Gender, Age is one's age, EDU is one's education status, P is one's living location, EMN is number of one's jobs, FSIZE is family size, LTY is logarithm of the total income that a family claims, and LANDA is the Mill's ratio for corresponding equation. For more details see table 3.
* In this equation Age and Education are family member's characteristics whose income is the highest in the family.

However, further on, using (1) we will integrate all these effects to find the effect at the family level. To continue, we analyze the results in identified years of policy shift.

3.1 Analyzing policy shifts by income groups

This section is based on substituting parameters in equations as shown in equations (22), and (23). In fact, we substitute coefficients of simulated unaffected hypothetical years for corresponding coefficients of affected years and compare the income sphere with the case without substitution. Following this we analyze these effects for the case of Iran. Figure 2 shows our findings; in each plot the horizontal axis is ten deciles and the vertical axis is the change in logarithms of average earnings in the corresponding subgroup; indeed, in notation of equation (23) the plot is $EFFECT_j^t$ with respect to j for deciles; and superscript t is for the fact that this is a change in the effect of a policy shift affecting year t. We have three activity groups in addition to the family level for a sector analysis. As an example, we take the figure for Entrepreneurs in year 1994; it shows that for two average individuals in the first and last deciles, the latter with higher income but both working as entrepreneurs, these policy shifts affecting 1994 have increased the logarithm of the income of the high income entrepreneurs and decreased that of the low income ones. In other words, poorer entrepreneurs have lost some opportunities that they would have had, had this policy not been implemented, and rich ones have, in effect, found new opportunities[4].

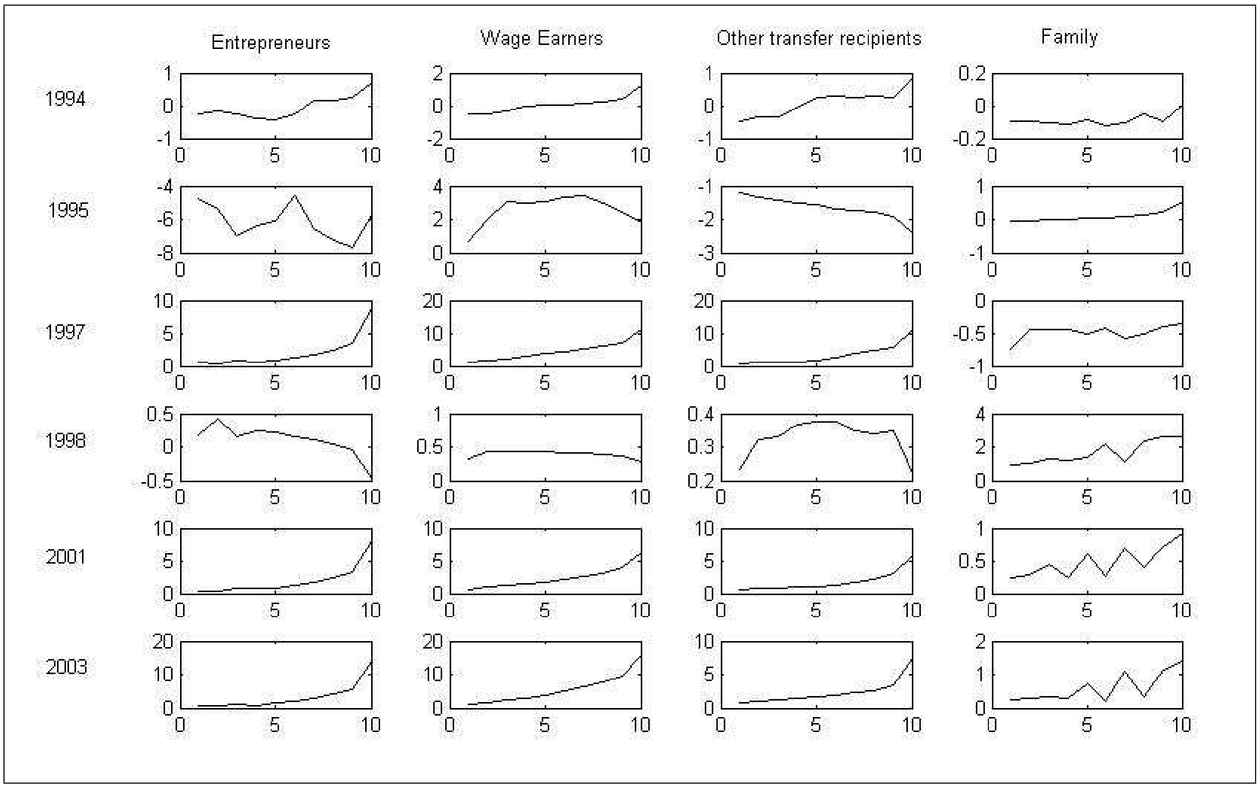
Policy shift effects in 1994: All occupations face unequal effects in addition to the fact that lower deciles always lose some opportunities and higher deciles gain from policy shifts. At the family level, there is no trend except a minor gap between the first and the last deciles. Moreover, lost opportunities at the family level are observed.

Policy shift effects in 1995: All entrepreneurs are caused to lose some opportunities, and this may be a side effect of the influence of high inflation, which decreased the value of their income. However, we have taken inflation into account. In contrast, wage earners observe an increase in income and this is probably due to the fact that the government tried

[4] Our data about family income is based on consumption in the family, but saving in this survey is evidently not to be trusted. So, by considering all activities, one may argue that our result has its source in the fact that higher income groups increase consumption less when faced by higher income. Indeed this fact does not detract from our analysis when we propose that the policy has not caused a more equitable distribution. However, if one extends this method to other cases in further research, this should be taken into account.

to compensate their losses from inflation. Given the effect on wage earners, entrepreneurs, other transfer recipients and other sources of household income, the figure shows that an average family in the first decile lost some opportunities as a result of the policy shift. On the other hand, an average family in the tenth decile has experienced an increase in income which was not possible in the case of "no policy shift".

Figure 2: Impact of policy shift on logarithm of earnings of occupations and families in income deciles (comparing an affected to a hypothetical unaffected situation)



Year 1995 is characterized by government attempts to distribute incomes more equally. These attempts made wages and some transfers more equal, but the government was not able to affect the earnings distribution of entrepreneurs and other sources of household income.

Policy shift effects in 1997: All occupations face unequal effects and at family level there is no trend except a minor gap between the first and last deciles. Moreover, lost opportunities at the family level are observed to stem from other sources of household income.

Policy shift effects in 1998: Attempts to distribute incomes more equally have shown a successful result in distributing wages, and the excess of entrepreneurs, but in other cases unequal effects are observed. In that year, effective policies caused an increase in the highest family decile's logarithm of earnings three times greater than that of the lowest decile's earnings, namely the lowest increased by one percent, and highest increased by three.[5]

Policy shifts in 2001 and 2003: Opportunities did not decrease, but policy shifts did cause an increase in higher deciles' opportunities more than that of lower deciles'. For example, entrepreneurs in all deciles are almost unaffected, but for deciles 9 and 10 a very large increase is observed. At the family level we observe, as in all other years, unequal effects. We can see that all deciles benefitted in addition to some especially high increments for the middle classes. Although an increase is achieved, it does not correspond with the government objective, which was for more equitable income distribution.[6]

4 Conclusions

In this paper, we have applied microsimulation using the Oaxaca-Blinder decomposition as well as a Heckman correction for sample selection bias in order to compare simulation results for a hypothetical unchanged situation with an actual policy shift.

This model has been applied to household data from Iran, and its results show some discontinuities in years 1994-95, 1997-98, 2001, and 2003. Based on the results of year 1995's and year 1998's changes, shifts in policies succeed in distributing wages more equitably, but not in distributing more equitably over most occupations and other sources of household income. In regard to other years, there is no evidence that policy shifts have reduced inequality. At the family level, the results show that the after-effect on incomes of policy shifts are observed in higher deciles of income, and that lower deciles of income suffer from either losing expected opportunities or else they are not affected as much in comparison to higher income deciles.

A useful extension of this paper would be a comparison of results with similar studies

[5] Indeed, we have observed that for this case Gini coefficients do not show this unequal effect.

[6] When we depict all effects for the family, it shows the same Gini coefficients in the simulated hypothetical year 2003 with a policy shift, and that without the policy shift. In fact, the Lorenz curves are nearly identical. But, one may see in figure 2 that there is a big gap between the gain of the first and the tenth deciles.

in other countries. In doing so, if the analysis comes out in the opposite direction and makes use of consumption data for tracing other sources of household income (since in our case, income data is not reliable as families are inclined not to declare the correct amount of their income), one should consider the smaller marginal propensity to consume for higher deciles of income.

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Appendix: Data

The Statistical Center of Iran (SCI) has been producing their Household Income and Expenditure Survey (HIES) since 1963. This survey had been implementing some improvements in definitions and samplings each year untill 1974 which makes it hard to compare different years. However, after 1974 basic definitions are compatible. We use fourteen series of the data from 1991 to 2004 to model the four equations in equations (2) and (3) which constitute (1). Since the main goal of this survey is obtaining weights for the consumer price index, it covers the whole country without any specific geographic area being excluded; moreover, it covers all consumption from food and clothing to durable goods over a 12 month period, and the whole income data starting with wages and ending with all other transfers in the same time period.[7] In table 2, sample sizes in the years under consideration in this paper are provided.

Table 2: Data sample sizes in different groups

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Families	17,755	14,713	12,003	18,779	33,906	20,824	20,795	13,954	26,944	25,021	22,608	31,598	22,902	22,902
Mean family size	5.65	5.60	5.36	5.40	5.43	5.31	5.23	5.34	5.14	5.00	4.57	4.81	4.70	4.70
Entrepreneurs	16,568	15,701	11,376	16,063	31,237	20,233	19,286	15,930	25,069	22,614	22,976	26,505	19,276	19,276
Wage earners	12,426	10,415	8,370	14,107	23,989	15,685	15,968	6,385	20,360	18,656	10,087	23,210	17,145	9,342
Other transfer recipients	4,768	3,966	3,127	5,513	11,209	6,499	6,914	5,567	12,209	11,166	12,391	15,277	10,010	10,010

We aggregate all activities to three main groups: wage earnings, business activity (entrepreneurs), and other kinds of transfers such as pensions, life insurance, etc., and these are the three activities we defined in equation 1. One big problem in this survey is that expressed incomes are not to be trusted, while expenditures can be. We aggregate all expenditure in the family, subtract this from the earnings of family members and add their expressed savings, which results in the difference between what the family earns and what it spends. This difference may have various sources: first, as mentioned above, is the fact that family members are not inclined to reveal their income. Second is the fact that families may be self employed. We call this difference "other sources of household income", and in the notation of equation 1 it is represented by y_h^o.

Definitions of variables we use in our application are presented in table 3. Income and expenditure data are aggregations of items to the three mentioned subgroups. Divisions

[7] Iran, Islamic Rep. of, Household Expenditure and Income Survey, 2003, GENERAL INFORMATION AND BASIC DEFINITIONS. <http://laborsta.ilo.org/applv8/data/SSM6/E/325A.html>.

are extensive and naming all of them is beyond the scope of this paper; more details may be requested from the authors.

Table 3: Definitions of variables in data

Variable	*Definition*	*Data Series' Source and Type*
EMN	Number of one's job	We have calculated this variable from the database; because there were many individuals who earned from several sources and we aggregated them.
M	One's membership	Dummy Variable 1 to 9, 1, head of household, 2, spouse, 3, children, 4, children in law, 5, grand children …
GE	Gender	Dummy Variable 1 for male, 2 for female.
AGE	Age	Age
EDU	Education*	Dummy Variable 1 to 4, 1, Educated and Graduated, 2, Educated and Student, 3, literate, 4, Illiterate
P	Living location	Dummy Variable 1 to 27 for states
EMST	Employment status	Dummy Variable 1 to 9, 1, employed, 2, seasonally unemployed, 3, insured unemployed …
FSIZE	Family Size	We have calculated this variable from the database.
LTY	Family expressed income	Aggregation of incomes family members admit that they earn

* There is extensive data about the level of education in this survey but we do not use it.