# THE IMPACT OF ARGENTINA'S SOCIAL ASSISTANCE PROGRAM *PLAN JEFES Y JEFAS DE HOGAR* ON STRUCTURAL POVERTY*

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*Resumen:* Se analiza el impacto del *Plan Jefes y Jefas de Hogar Desocupados* en la pobreza estructural. Este programa de asistencia social, introducido en el año 2002 como respuesta a la intensa crisis económica y política que afectó a la Argentina a finales del año 2001, propone una transferencia monetaria a los jefes de familia desocupados con hijos menores de 18 años o discapacitados de cualquier edad a cargo. Se ha encontrado que el impacto del plan *JJH* en los aspectos monetarios de la pobreza es menor y que su impacto sobre el desempleo es incierto, porque no queda claro en que casos ha generado nuevos empleos.

*Abstract:* In this article, we analyze the impact of the *Plan Jefes y Jefas de Hogar Desocupados* on structural poverty. This social assistance program, introduced in 2002 as a response to the severe economic and political crisis that affected Argentina at the end of 2001, proposes a cash transfer to unemployed heads of households with dependents under the age of 18 or with disabled individuals of any age. We found that the impact of the *JJH* program on the monetary aspect of poverty is minor and its impact on employment is uncertain, because it is not clear whether it generated new jobs.

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## 1. Introduction

Income transfer programs are a common social policy response to economic crises. While the aims of the government may vary in practice, the common goal is to help protecting the living standards of those families most adversely affected by the crisis. One of the largest programs implemented in Argentina in recent times is the *Plan Jefes y Jefas de Hogar Desocupados* (Program for Unemployed Male and Female Heads of Households) (*JJH* program) introduced in January 2002. This was the main public safety net response to the severe economic and political crisis that hit Argentina at the end of 2001 and raised unemployment and poverty rates to record levels during the crisis (World Bank, 2003). This program aimed at providing direct income support to families with dependents who had lost their main source of earnings during the crisis. To make sure that the program reached those in greatest need, work requirements were imposed. With support from a World Bank loan (and equivalent counterpart funds from the government), the program expanded rapidly to cover about two million households by the end of 2002.

Several studies have assessed the impact of the *JJH* program, principally its impact on income poverty, inequality and economic growth (Galasso and Ravallion, 2003; Gertel, Giuliodori and Rodriguez, 2005; Roca *et al.*, 2005; Kostzer, 2008). In spite of the large consensus that recognises poverty as a complex phenomenon that cannot be reduced to a unique monetary dimension, to the best of our knowledge there are no papers that look at the multidimensional aspects of poverty among the beneficiaries of this program. The program was initially an emergency policy implemented to counterbalance the disastrous consequences of the economic crisis on the living standard of Argentinean people. Hence, it did not justify a multidimensional analysis of poverty, which is commonly associated with the notion of structural poverty. Nevertheless, the publicly announced intentions of the actual government to continue and to intensify the implementation of the *JJH* program validate the study of its long-term impact on poverty.

The aim of this article is to study the intensity of structural poverty among the program's beneficiaries in order to identify the main characteristics of poverty and the dimensions of multidimensional poverty that are directly affected by the social program. The analytical tool selected to evaluate the situation of the beneficiaries of the *Plan Jefes y Jefas de Hogar* and the ongoing effects of this program is the multidimensional poverty index based on fuzzy set

theory, which has interesting decomposition properties. This tool is particularly adapted to study impact on poverty of this kind of social programs based on monetary transfers because it goes beyond a simple division of the population into two groups: the poor and the non-poor. In addition, more robust conclusions may be derived concerning the durable poverty reduction effects of the program.

This article is organized as follows. Section 2 presents the basic notions of the multidimensional approach to poverty based on the theory of fuzzy sets and its decomposition properties. Section 3 proposes a brief description of the program *Plan Jefes y Jefas de Hogar* and the main results of the application of the multidimensional approach of poverty to this data set. Concluding remarks are given in section 4.

## 2. Multidimensional Measurement of Poverty

Most of the methods used in analyzing poverty share two main limitations: (*i*) they are unidimensional, i.e. they consider a single dimension, generally income, occasionally expenditures, as the only variable supposed to capture the intensity of poverty; (*ii*) on the basis of the so-called poverty line they dichotomise the population into two groups, the *poor* and the *non-poor*.

However, poverty is a complex phenomenon that cannot be reduced to a unique monetary dimension. There is thus a need for a multidimensional approach taking into account various non-monetary indicators of living conditions (i.e. Kolm, 1977; Atkinson and Bourguignon, 1982; Maasoumi, 1986; and Tsui, 1995).[1]

By contrast, little attention has been devoted to the second limitation of the traditional approach, i.e. its rigid poor/non-poor dichotomy. Yet it is undisputable that such a clear cut division causes a loss of information and removes the nuances that exist between the two extremes of substantial welfare on the one hand and distinct material hardship on the other (Betti *et al.*, 2005). In other words, poverty should be considered as a matter of *degree* rather than an attribute that is simply present or absent among individuals in the population.

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[1] Several authors have proposed and/or analysed different multidimensional poverty measures. See Van Praag (1978), Atkinson (1987, 1992, 2003), Jenkins and Lambert (1993), the United Nations Development Program (1997, 1998), Carvalho and White (1997), Zheng (1997), Bourguignon and Chakravarty (1999, 2003), Deutsch and Silber (2005).

An early attempt to incorporate this concept at the methodological level was made by Cerioli and Zani (1990) who drew their inspiration from the *Fuzzy Sets Theory* initiated by Zadeh (1965). The authors developed the first multidimensional method based on fuzzy set theory, which makes it possible to derive a poverty index that includes different dimensions (attributes) of poverty. This method was further discussed by Dagum, Gambassi and Lemmi (1991), Cheli *et al.* (1994), Chiappero-Martinetti (1994, 2000), Cheli and Lemmi (1995) Vero and Werquin (1997), Cheli and Betti (1999), Lelli (2001), Qizilbash (2003), Eurostat (2003), Betti, Cheli and Cambini (2004) and Dagum and Costa (2004), Lemmi and Betti (2006).

### 2.1. *A Multidimensional Approach to Poverty Using Fuzzy Set Theory*

This section relies on a previous paper by Dagum and Costa (2004) and briefly summarizes the basic concepts related to the multidimensional analysis of poverty in the framework of the fuzzy set theory.

Let $A = \{a_1, ..., a_i, ..., a_n\}$ be the population object of the research, where $n$ is the cardinality of the set $A$ and $X = \{X_1, ..., X_j, ..., X_m\}$ are the vector of attributes. Then $B$ is a fuzzy sub-set of households in $A$ such that any household $a_i \in B$ presents some degrees of poverty in at least one of the m attributes selected to study multidimensional poverty.

The degree of membership of the $i$-th household $(i = 1, ..., n)$ to the fuzzy sub-set $B$ with respect to the $j$-th attribute is defined as the quantity of the $j$-th attribute $(j = 1, ..., m)$ possessed by the $i$-th household. Formally:

$$x_{ij} := \mu_B \left( X_j \left( a_i \right) \right), 0 \leq x_{ij} \leq 1 \tag{1}$$

In particular:

- $x_{ij} = 1$, if the $i$-th household does not possess the $j$-th attribute;

- $x_{ij} = 0$, if the $i$-th household possesses the $j$-th attribute;

- $0 < x_{ij} < 1$, if the $i$-th household possesses the $j$-th attribute with an intensity belonging to the open interval $(0, 1)$.

The degree of membership of the $i$-th household to the fuzzy sub-set $B$ is defined as a weighted average of $x_{ij}$:

$$\mu_B\left(a_i\right) = \left.\sum_{j=1}^{m} x_{ij}\, w_j \middle/ \sum_{j=1}^{m} w_j \right. \tag{2}$$

The equation $\mu_B(a_i)$ yields the multidimensional poverty index of the $i$-th household. It is a weighted function of the $m$ attributes, where $w_j$ is the weight attached to the $j$-th attribute. Following this definition, one obtains:

$$0 \leq \mu_B\left(a_i\right) \leq 1 \tag{3}$$

In particular:

- $\mu_B(a_i) = 0$, if $a_i$ is completely non-poor in the $m$ attributes;
- $\mu_B(a_i) = 1$, if $a_i$ is totally poor in the $m$ attributes;
- $0 < \mu_B(a_i) < 1$, if $a_i$ is partially or totally deprived in some attributes but not fully deprived in all of them.

The weight $w_j$ attached to the $j$-th attribute, and used in this paper, was proposed by Betti and Verma (1999). It takes into account the intensity of deprivation of $X_j$, and it limits the influence of those indicators that are highly correlated. The authors defined the weight of any attribute as follows:

$$w_j = w_j^a * w_j^b \tag{4}$$

where $w_j^a$ only depends on the distribution of the $j$-th attribute, whereas $w_j^b$ depends on the correlation between $X_j$ and the other dimensions.

In particular, $w_j^a$ is determined by the coefficient of variation of the attribute concerned:

$$w_j^a = \left.\left[\left.\sum_{i=1}^{n}\left(x_{ij} - \bar{x}_j\right)^2 \middle/ n\right]^{1/2} \middle/ \left(\left.\sum_{i=1}^{n} x_{ij} \middle/ n\right.\right)\right. \tag{4'}$$

The weights $w_j^b$ are computed as follows:

$$w_j^b = \left[\frac{1}{1 + \left.\sum_{j'=1}^{m} \rho_{j,j'} \middle/ \rho_{j,j'} < \rho_H\right.}\right] * \left[\frac{1}{\left.\sum_{j'=1}^{m} \rho_{j,j'} \middle/ \middle/ \rho_{j,j'} \geq \rho_H\right.}\right] \tag{4''}$$

where $\rho_{j,j'}$ is the correlation between the two indicators. In the first factor of the equation, the sum is taken over all the indicators whose correlation with the $j$-th dimension is less than a certain value $\rho_H$ (determined by dividing the ordered set of correlation values at the point of the largest gap). The sum in the second term always includes the case $j' = j$, since the correlation coefficient is 1.

The fuzzy poverty index of the $A$ set is a weighted average of $\mu_B(a_i)$:

$$\mu_B = \sum_{i=1}^{n} \mu_B(a_i) g(a_i) \bigg/ \sum_{i=1}^{n} g(a_i) \qquad (5)$$

where $g(a_i)$ represents the number of households, in the total population, statistically represented by each sample observation $a_i$.

The theory of fuzzy sets also allows one to derive a unidimensional poverty index for each one of the $m$ attributes:

$$\mu_B(X_j) = \sum_{i=1}^{n} x_{ij} g(a_i) \bigg/ \sum_{i=1}^{n} g(a_i) \qquad (6)$$

$\mu_B(X_j)$ measures the degree of deprivation of the $j$-th attribute for the entire population of $n$ households.

We can also rewrite the fuzzy poverty index as a weighted function of the unidimensional poverty indexes:

$$\mu_B = \sum_{j=1}^{m} \mu_B(X_j) w_j \bigg/ \sum_{j=1}^{m} w_j \qquad (7)$$

The analysis of the results obtained in (6), for all $j = 1, ..., m$, enables policy makers to identify monetary and non-monetary aspects of poverty.

## 2.2. *Decompositions of the Multidimensional Fuzzy Poverty Index*

Three kinds of decompositions are satisfied by the multidimensional fuzzy poverty index (see Mussard and Pi Alperin, 2007; and Pi Alperin, 2007): *i*) the group and sub-group decompositions; *ii*) the attribute decompositions; and finally, *iii*) the multidimensional decomposition

### 2.2.1. Group and Sub-Group Decompositions

As Mussard and Pi Alperin (2007) show, a richer way to evaluate the structure of poverty is to provide a decomposition by sub-population groups. Let us divide the total economic surface into $s$ groups, $S_k$, of size $n_k (k = 1, ..., s)$. The intensity of poverty of the $i$-th household of $S_k$ is given by:

$$\mu_B(a_i^k) = \sum_{j=1}^{m} x_{ij}^k w_j \left/ \sum_{j=1}^{m} w_j \right. \tag{8}$$

where $x_{ij}^k$ is the degree of membership related to the fuzzy sub-set $B$ of the $i$-th household of $S_k (i = 1, ..., n_k)$ with respect to the $j$-th attribute $(j = 1, ..., m)$. Then, the fuzzy poverty index associated with group $S_k$ is:[2]

$$\mu_B^k = \sum_{i=1}^{n_k} \mu_B\left(a_i^k\right) g\left(a_i^k\right) \left/ \sum_{i=1}^{n_k} g\left(a_i^k\right) \right. \tag{9}$$

Following (9), the overall fuzzy poverty index can be computed as a weighted average of the poverty level within each group:

$$\mu_B = \sum_{k=1}^{s} \sum_{i=1}^{n_k} \mu_B\left(a_i^k\right) g\left(a_i^k\right) \left/ \sum_{i=1}^{n} g\left(a_i\right) \right. \tag{10}$$

Hence, it is possible to measure the contribution of the $k$-th group to the global index of poverty:

$$C_{\mu_B}^k = \sum_{i=1}^{n_k} \mu_B\left(a_i^k\right) g\left(a_i^k\right) \left/ \sum_{i=1}^{n} g\left(a_i\right) \right. \tag{11}$$

This decomposition allows policy makers to focus on the poorest groups (region, educational group, etc.) when aiming at reducing overall poverty.

Now, let us divide each one of the $s$ groups, $S_k$, $(k = 1, ..., s)$, into $p$ sub-groups $S_{bk}$ $(b = 1, ..., p)$ of size $n_{bk}$. The intensity of poverty of the $i$-th household of sub-group $S_{bk}$ is:

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[2] $g\left(a_i^k\right) \left/ \sum_{i=1}^{n_k} g\left(a_i^k\right) \right.$ is the relative frequency represented by the sample observation $a_i^k$ of $S_k$.

$$\mu_B\left(a_i^{bk}\right) = \sum_{j=1}^{m} x_{ij}^{bk} w_j \left/ \sum_{j=1}^{m} w_j \right. \tag{12}$$

where $x_{ij}^{bk}$ is the degree of membership related to the fuzzy sub-set $B$ of the $i$-th household of $S_{bk}$ $(i = 1, ..., n_{bk})$ with respect of the $j$-th attribute $(j = 1, ..., m)$. Thus, we can measure the state of poverty within each sub-group:[3]

$$\mu_B^{bk} = \sum_{i=1}^{n_{bk}} \mu_B\left(a_i^{bk}\right) g\left(a_i^{bk}\right) \left/ \sum_{i=1}^{n_{bk}} g\left(a_i^{bk}\right) \right. \tag{13}$$

Also, it is possible to calculate the contribution of the $b$-th sub-group to the $k$-th group's multidimensional poverty index:

$$C_{\mu_B^k}^{bk} = \sum_{i=1}^{n_{bk}} \mu_B\left(a_i^{bk}\right) g\left(a_i^{bk}\right) \left/ \sum_{i=1}^{n_k} g\left(a_i^k\right) \right. \tag{14}$$

Hence, the overall fuzzy poverty index can be defined as a weighted average of the poverty intensity that exists within the groups of the second partition:

$$\mu_B = \sum_{b=1}^{p} \sum_{k=1}^{s} \sum_{i=1}^{n_{bk}} \mu_B\left(a_i^{bk}\right) g\left(a_i^{bk}\right) \left/ \sum_{i=1}^{n} g\left(a_i\right) \right. \tag{15}$$

Consequently, the contribution to the global poverty index of the $b$-th sub-group of the $k$-th group is:

$$C_{\mu_B}^{bk} = \sum_{i=1}^{n_{bk}} \mu_B\left(a_i^{bk}\right) g\left(a_i^{bk}\right) \left/ \sum_{i=1}^{n} g\left(a_i\right) \right. \tag{16}$$

This multi-level decomposition allows us to compute precisely the sub-group determinants (gender, educational group, age group, region, etc.) that contribute to amplify the global poverty.

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[3] $g\left(a_i^{bk}\right) \left/ \sum_{i=1}^{n_{bk}} g\left(a_i^{bk}\right) \right.$ is the relative frequency represented by the sample observation $a_i^{bk}$ of $S_{bk}$.

2.2.1.1. The $\alpha$-Cut Concept

An interesting sub-group decomposition could arise from the application of the $\alpha$-cut concept in the theory of fuzzy sets. It allows the determination of nested subsets of poor households classified by decreasing intensity of deprivation.

Given the set $A$ of households and a fuzzy set $B \subset A$, an $\alpha$-cut is the fuzzy set $B_\alpha$ such that,

$$B_\alpha = \{a_i^\alpha \in A / \mu_B(a_i) \geq \alpha, \ \alpha \in (0, 1]\}$$

where $(0, 1]$ is an open-closed interval and $\mu_B(a_i)$ is the multidimensional poverty index of the $i$-th household. Since $\alpha > 0$, an $\alpha$-cut is formed by the members of $A$ that belong to the fuzzy set $B$, such that, $a_i \in B$ and the $i$-th households poverty index $\mu_B(a_i) \geq \alpha > 0$.

Let $F(\alpha)$ stands for the cumulative distribution function by decreasing sizes of the households poverty ratios $\mu_B(a_i)$, $i = 1, ..., n$, then $F(\alpha) = P(\mu_B(a_i) \geq \alpha)$. For $F(\alpha) = 0.05$, we have:

$$\alpha = F^{-1}(0.05) = \max_{\{i\}} \{\mu_B(a_i), \ s.t., \ F(\mu_B(a_i)) \geq 0.05\}$$

Hence, the fuzzy set $B_\alpha$ for $F(\alpha) = 0.05$ contains the 5% poorest households, i.e., the 5% with the greatest values of $\mu_B(a_i)$.

2.2.2. Decomposition by Attribute: Dagum and Costa (2004)

Dagum and Costa (2004) introduced the concept of decomposition by attribute, showing that it is possible to gauge the contribution of the $j$-th attribute to the overall amount of poverty:

$$C_{\mu_B}^j = \mu_B(X_j) w_j \left/ \sum_{j=1}^m w_j \right. \tag{17}$$

According to (17), it is possible to calculate the contribution of the $j$-th attribute to the $k$-th group, and the contribution of the $j$-th attribute to the $b$-th sub-group.

The unidimensional poverty index of the $j$-th attribute for the $k$-th group is expressed as:

$$\mu_B\left(X_j^k\right) = \sum_{i=1}^{n_k} x_{ij}^k g\left(a_i^k\right) \Big/ \sum_{i=1}^{n_k} g\left(a_i^k\right) \tag{18}$$

Using (18) it is possible to estimate the contribution of the $j$-th attribute to the $k$-th group:

$$C_{\mu_B^k}^j = \mu_B\left(X_j^k\right) w_j \Big/ \sum_{j=1}^m w_j \tag{19}$$

Secondly, the unidimensional poverty index of the $j$-th attribute in $S_{bk}$ can be defined as follows:

$$\mu_B\left(X_j^{bk}\right) = \sum_{i=1}^{n_{bk}} x_{ij}^{bk} g\left(a_i^{bk}\right) \Big/ \sum_{i=1}^{n_{bk}} g\left(a_i^{bk}\right) \tag{20}$$

This gives the contribution of the $j$-th attribute to the $b$-th sub-group poverty index:

$$C_{\mu_B^{bk}}^j = \mu_B\left(X_j^{bk}\right) w_j \Big/ \sum_{j=1}^m w_j \tag{21}$$

Contrary to the group and sub-group decompositions, the attribute decomposition allows decision makers to obtain more information about different characteristics of poverty. Therefore, it yields more precision in designing an appropriate structural socio-economic policy aimed at alleviating poverty.

### 2.2.3. Multidimensional Decomposition

Chakravarty, Mukherjee and Ranade (1998) introduced a class of poverty indexes simultaneously decomposable by attribute and by sub-population. Mussard and Pi Alperin (2007) have demonstrated that the multidimensional fuzzy index of poverty satisfies this property.

Following (18), we define the fuzzy poverty index as a weighted function of the unidimensional poverty indexes by attribute for all groups:

$$\mu_B = \sum_{k=1}^{s} \sum_{j=1}^{m} \mu_B \left( X_j^k \right) w_j \Bigg/ \sum_{j=1}^{m} w_j \qquad (22)$$

Thus, it is possible to gauge the contribution of the $j$-th attribute of the $k$-th group to the global index of poverty:

$$C_{\mu_B}^{jk} = \mu_B \left( X_j^k \right) w_j \Bigg/ \sum_{j=1}^{m} w_j \qquad (23)$$

This combined decomposition gives the contribution to overall poverty of all the couples "attribute/group" If two partitions of groups are taken into account, and if we consider the unidimensional poverty index of the $j$-th attribute in $S_{bk}$ (20), the multidimensional poverty index for the entire economic surface is:

$$\mu_B = \sum_{k=1}^{s} \sum_{b=1}^{p} \sum_{j=1}^{m} \mu_B \left( X_j^{bk} \right) w_j \Bigg/ \sum_{j=1}^{m} w_j \qquad (24)$$

Therefore, we measure the contribution of the pairs "sub-group/attribute" to $\mu_B$:

$$C_{\mu_B}^{jbk} = \mu_B \left( X_j^{bk} \right) w_j \Bigg/ \sum_{j=1}^{m} w_j \qquad (25)$$

As mentioned previously, these decompositions give precious information on how to reduce the intensity of poverty.

## 3. The *Jefes y Jefas de Hogar* Program

### 3.1. *The Characteristics of the Program*

Extreme poverty levels have been experienced in Argentina following the severe economic crisis that reached a critical point at the end of 2001. Widespread concerns about the impending collapse of the "convertibility plan" (whereby the Argentinean peso was pegged to the dollar) and possible default on external debt led to draconian measures to prevent withdrawals of bank deposits, which in turn tightened

liquidity constraints (Galasso and Ravallion, 2003). The almost immediate welfare impacts were severe. Unemployment rose sharply, as did various indicators of poverty (Fiszbein, Giovagnoli and Aduriz, 2002; World Bank, 2003).

The net response of Argentina's government to the social crisis was the implementation of the *Jefes y Jefas de Hogar* program.[4] The program was implemented in a mixture of centralized and decentralized ways by the Ministry of Labor, Employment, and Social Security, which was responsible for the direct payment, but the projects were defined at the local level, as were the beneficiaries. The legal instrument of the *JJH* program was the Decree of the National Government 565/2002 of May 2002, designed as *Derecho de Inclusión Familiar* (Entitlement for Family Inclusion). This decree proposes a social assistance program focused on the unemployed heads of households with dependents under the age of 18 or with disabled individuals of any age. In order to achieve the social objectives stated above, a cash transfer of U$S45 ($150 Argentine Pesos, three-quarters of the minimum wage at the time) per month is given to each beneficiary, which corresponded to the cost of the basic basket for an adult at the end of 2002.[5]

In order to be eligible for the program, recipients must be engaged in one of the following activities: a training program (not clearly established), work for the community for up to 20 hours per week (which would be defined and verified locally through a political mechanism) or work for a private company which receives an employment subsidy.[6]

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[4] Act 25.561 and the Regulatory Decree 165/2002 declare national emergency until December 31, 2002. Within this framework, on January 1, 2002 a bill with the guidelines of the *JJH* program began to be considered, and was finally enacted under the Executive Act 565 dated April 3. Under this act, the Treasury Department became responsible for reallocating the resources of the National Budget necessary for the Program's implementation (sect.15). The Program was then extended (and was still in force in 2004), and in 2003, the World Bank approved a loan of U$S 600 million to be allocated, together with national resources, to the expansion of the program so as to cover 1,750,000 recipients. For an assessment of the program according to its value as a social safety net, see, for example, Galasso and Ravallion (2003) and Kostzer (2008).

[5] By December 2002 the cost of the basic basket for an adult had reached $232.59.

[6] As a condition for financing the program, the World Bank insisted that the vast majority (90% was the target) of *JJH beneficiaries* should do some kind of work (Galasso and Ravallion, 2003).

Among the positive aspects of the *JJH* program one may mention its "universality". In comparison to prior programs such as the *Joven* program (focused on a given age group and on labour training for low skilled workers), or the *Trabajar* program (a workfare program which included a tightly enforced work requirement of 30-40 hours, the work being supposed to be of value to residents of poor communities), the *JJH* program did not have an explicitly stated poverty focus.

One weakness of the *JJH* program is that, since by mid-2002 the amount of subsidy scarcely covered the cost of the basic subsistence basket for one person, it was insufficient to guarantee an objective such as the "right to social inclusion" of the household, a goal explicitly stated in the first paragraph of the executive act creating the program. The program has some additional weaknesses. It had been estimated that the potential number of eligible beneficiaries would amount to 1,750,000 recipients during the 2002 economic emergency, and that there would be a decrease in the number of its beneficiaries in 2003 and 2004. However, the national budget for 2007 provides for the continuity of the program and the number of recipients continues to be close to 1,6 million. Thus, poverty does not seem to have decreased significantly (Gertel, Giuliodori and Rodriguez, 2005).

One of the main research questions has to deal with the level of social protection that the Argentina's *JJH* program can provide to the indigent and the poor after the worst period of the crisis is over. In the next sections we will analyse the characteristics of the beneficiaries of *JJH* program and the impact of such a monetary transfer on structural poverty, using the multidimensional decomposition techniques described in the previous section.

## 3.2. *The Characteristics of Multidimensional Poverty in Argentina*

This study uses the multidimensional measures of poverty based on the theory of fuzzy sets and its decomposition properties. The empirical application covers 22.115 households in October 2002.[7] The database used in this study comes from the *Encuesta permanente de hogares* (EPH), a permanent survey of households. This multidimensional survey has been performed every year since 1974 by the INDEC (Argentina Institute of Statistics and Census). The survey includes

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[7] 95.5% of households are not beneficiaries of the program, 3.96% of the households receive the *JJH* program and only 0.54% of the households receive another kind of program which is not specified by the database.

information on income, labour, market characteristics, demographic characteristics, housing, education and training.

The two principal criteria that guide the selection of the socio-economic attributes are: the definition of structurally poor people proposed by the CEPAL (2004)[8] and the information provided by the EPH. This choice is very important because each attribute reflects an aspect of deprivation and social exclusion. The selected attributes are: the household equivalent income[9] ($X_1$); the size of the household ($X_2$); access to water ($X_3$); toilet characteristics ($X_4$); construction materials of the house ($X_5$); the occupancy title and location of the household residence ($X_6$); the ratio of the number of household members with an income over the total number of household members ($X_7$); the stability of occupation of the reference person ($X_8$); pension and other benefits of the employed person ($X_9$); and the highest level of education completed by the reference person ($X_{10}$).[10]

The Multidimensional Poverty Index (MPI) for Argentina in October 2002 is $\mu_B = 0.104$, implying that 10.4% of Argentina's households are structurally poor. We have estimated the unidimensional poverty indexes (UPI) for the various attributes to identify the main characteristics of the poor households (see table 1). Among these ten attributes, the level of education ($X_{10}$) appears as the most important dimension of poverty followed by the household equivalent income ($X_1$), the stability of occupation of the reference person ($X_8$), and the ratio of the number of household members with an income over the total number of household members ($X_7$).

We also measured the contribution of each dimension to global poverty (see table 1). The four indicators with the highest contribution to MPI are: the ratio of the number of household members with an income over the total number of household members ($X_7$), the stability of the occupation of the reference person ($X_8$), pension and others benefits for the employed person social contributions ($X_9$) and the educational level of the reference person ($X_{10}$).

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[8] The Economic Center for Latin America and the Caribbean (2004) defines the structurally poor as people living in an inadequate household, in overcrowded conditions, with difficulties in accessing potable water, with a low level of education of the reference person, and a weak subsistence capacity.

[9] Divided by the corresponding value of the equivalent scale. See Dagum and Costa (2004) for more details on this method. See table A.II.1, in appendix II, for the values of the equivalent scales used in this study.

[10] Appendix A.I presents the degree of membership and description of the socio-economic attributes.

**Table 1**

*UPI by attribute for the entire population
and relative contribution to MPI*

| Attributes | $X_1$ | $X_2$ | $X_3$ | $X_4$ |
|---|---|---|---|---|
| UPI | **0.3827** | 0.0956 | 0.0143 | 0.0221 |
| Rel. Contribution | [8.67] | [6.60] | [3.12] | [2.83] |

| $X_5$ | $X_6$ | $X_7$ | $X_8$ | $X_9$ | $X_{10}$ |
|---|---|---|---|---|---|
| 0.0168 | 0.1708 | **0.1875** | **0.2031** | 0.1592 | **0.5948** |
| [2.52] | [10.01] | **[20.60]** | **[18.12]** | **[14.96]** | **[12.56]** |

Let us analyse the impact of the *JJH* program on global poverty. Behavioural responses are also relevant to assess the impacts on poverty. Following common practice (cf. INDEC, 2002), we calculated the program's poverty impact by subtracting the *JJH* payment from the incomes of beneficiaries, reducing the number of household members with income and considering that each beneficiary who receives the payment is unemployed. Thus the poverty rate in the absence of the program could be readily calculated from the simulated distribution of net incomes, and the stability of occupation of the reference person.

Table 2 presents the results of this simulation. Only three dimensions are affected:[11] income ($X_1$), the ratio of the number of household members with an income over the total number of household members ($X_7$) and the stability of the occupation of the reference person ($X_8$). After subtracting the payment from the income of the beneficiaries, the value of the attribute "household equivalent income" increased by 0.55 points whereas that of the variables "ratio of the number of household members with an income over the total number of household members" and "stability of the occupation of the reference person" increased by 2.05 and 3.64 points, respectively. The impact of the *JJH* program on the monetary aspect of poverty is hence minor. Its impact on employment is however uncertain, because it is not clear whether it has generated new jobs.

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[11] We must note that the relative contributions of all the attributes have changed because a different system of weights was calculated in this simulation. When we subtracted the *JJH* payment from the incomes of beneficiaries, reduced the number of household members with income and considered that each of the beneficiaries who receive the payment is unemployed; the values of the $x_{ij}$ changed for $j = 1$, 7, 8 and for each *JJH* beneficiary, so $w_1, w_7, w_8$ and Sum $w_j$, have also different values.

**Table 2**

*UPI by attribute for the entire population without the*
*JJH payment and relative contribution to MPI*

| Attributes | $X_1$ | $X_2$ | $X_3$ | $X_4$ |
|---|---|---|---|---|
| UPI | **0.3882** | 0.0956 | 0.0143 | 0.0221 |
| Rel. Contribution | [10.04] | [7.56] | [3.73] | [3.37] |

| $X_5$ | $X_6$ | $X_7$ | $X_8$ | $X_9$ | $X_{10}$ |
|---|---|---|---|---|---|
| 0.0168 | 0.1708 | **0.208** | **0.2395** | 0.1592 | 0.5948 |
| [3.01] | [11.86] | [17.62] | [14.09] | [13.83] | [14.90] |

3.2.1. Simple Group Decomposition

Let us first classify the population into three groups: the *JJH* beneficiaries, the non-beneficiaries, and those benefiting from another program.[12] The results are given in table 3.

**Table 3**

*MPI by Beneficiaries'Decomposition*
*and Relative Contribution to MPI*

| First Partition | MPI by Group of Population | Relative Contribution to MPI |
|---|---|---|
| *JJH* Beneficiaries | 0.2090 | 7.33% |
| No Beneficiaries | 0.0998 | 92.3% |
| Other Programs Beneficiaries | 0.1607 | 0.37% |

The decomposition by beneficiaries shows that the *JJH* program beneficiaries are the poorest group with 20.9% of its population structurally poor. A look at the groups'contributions shows however that 92.30% of the intensity of poverty is explained by the non-beneficiaries group. This result is plausible since the relative contribution involves the number of representative households in each group.[13]

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[12]  The EPH does not give detailed information on the help received via other programs.

[13]  See footnote 7.

Let us now apply the multidimensional decomposition. Table 4 presents the UPI by attribute and by groups of population, and their relative contribution to global MPI. This decomposition allows us to identify the main dimensions that generate poverty. The results show that, with the exception of "the ratio of the number of household members with an income over the total number of household members" $(X_7)$ and "the stability of occupation of the reference person" $(X_8)$, the JJH participant households are poorer than non-beneficiaries. These results seem therefore to show that the JJH program is well targeted.

**Table 4**

*UPI by attribute and by beneficiaries*

| Partition | $X_1$ | $X_2$ | $X_3$ | $X_4$ |
|---|---|---|---|---|
| JJH Beneficiaries | 0.7475 | 0.3134 | 0.0647 | 0.0781 |
| | [3.75] | [4.79] | [3.13] | [2.22] |
| No Beneficiaries | 0.3681 | 0.0873 | 0.0124 | 0.02 |
| | [1.85] | [1.33] | [0.6] | [0.57] |
| Other Progr. | 0.676 | 0.1084 | 0.0118 | 0.0076 |
| Beneficiaries | [3.39] | [1.66] | [0.57] | [0.22] |

| $X_5$ | $X_6$ | $X_7$ | $X_8$ | $X_9$ | $X_{10}$ |
|---|---|---|---|---|---|
| 0.046 | 0.272 | 0.0591 | 0.000 | 0.979 | 0.8 |
| [0.53] | [3.53] | [1.44] | [0.0] | [20.38] | [3.74] |
| 0.0155 | 0.1669 | 0.1927 | 0.2113 | 0.1262 | 0.5866 |
| [0.52] | [2.17] | [4.69] | [4.17] | [2.63] | [2.74] |
| 0.0642 | 0.1862 | 0.0643 | 0.000 | 0.9052 | 0.7348 |
| [2.14] | [2.42] | [1.57] | [0.0] | [18.84] | [3.44] |

Note: [.] relative contribution to global MPI.

Some additional points should be stressed. All beneficiaries of the plan are considered by the INDEC as employed so $X_8 = 0$. But, they do not receive the pensions and other benefits perceived by employed people $(X_9 = 0.979)$, so they could be considered as working in an informal market.

Studying in detail the poverty characteristics of the households perceiving this monetary transfer, we note that an important part of this population must affront several difficulties as they live in overcrowded conditions, without an occupancy title of the household res-

idence, and with very important educational problems.[14] The household equivalent income shows that more that 74% of households that perceived the program do not have enough income to be considered as non-poor according to this attribute.


### 3.2.2. The Multi-Level Decomposition

In order to better analyse the intensity of structural poverty of the different sub-groups of *JJH* beneficiaries, we have derived some multi-level decompositions. The first partition was by *JJH* beneficiaries, non beneficiaries and beneficiaries of other programs. Several secondary partitions of the population are proposed: (*i*) by gender of the reference person (*ii*) by age of reference person: less that 25 years old, between 25 and 45 years old, between 46 and 65 years old, and more than 65 years old; (*iii*) by civil status: single, living as a couple but not married, married, divorced and widower; (*iv*) by principal regions of Argentina: Cuyo, Grand Buenos Aires, North-east; North-west; Pampeana and Patagonia; and (*v*) by the number of members of the household receiving income: from 0 to 7. In the following, only the results for the *JJH* beneficiaries are presented.

The multidimensional poverty indexes for each sub-population, presented in table 5, show that the female beneficiaries of the program are more affected by poverty than men (21.25% *versus* 20.63%, respectively). Those less than 25 years old (28.23%) or between 25 and 45 years old (20.79%) have the highest poverty indexes. Beneficiaries living as a couple but not married (23.63%) and single beneficiaries (23.27%) are more affected by the intensity of poverty than those of other civil status. Beneficiaries living in the North of Argentina (Cuyo: 26.81% North-west: 21.48%; and North-east: 23.78%) are poorer than those living in the Centre or in the South. Finally, households with no member receiving income (38.97%) followed by households with six members receiving income (37.41%) are more affected by poverty than the other sub-groups. The fact that the households with six members working were the second poorest sub-group shows the precariousness of the income of employed persons.

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[14] Roca *et al.* (2005) asked about the highest educational level reached by the beneficiaries of *JJH* program: 20% of the participants did not finish primary school (in Argentina between first and seventh grade), while 37% did. The rest is divided between 25% that started, but did not conclude secondary school, 11% that finished secondary studies (5 years, generally starting at the age of 13 years old), and 7% that began university.

**Table 5**

*MPI by Different Decompositions and*
*Their Relative Contribution to Global MPI*

| First Partition | Second Partition | MPI by Sub-group of Population | Relative Contribution to MPI (%) |
|---|---|---|---|
| | | *Sex* | |
| | Man | 0.2063 | **4.09** |
| | Woman | **0.2125** | 3.23 |
| | | *Age* | |
| | < 25 | **0.2823** | 1.09 |
| | 25-45 | **0.2079** | **4.45** |
| | 45-65 | 0.1821 | 1.61 |
| | > 65 | 0.1877 | 0.19 |
| | | *Civil Status* | |
| JJH | Single | **0.2327** | 1.05 |
| Beneficiaries | Couple | **0.2363** | **2.26** |
| | Married | 0.1894 | **2.18** |
| | Divorced | 0.1979 | 1.51 |
| | Widower | 0.1768 | 0.32 |
| | | *Regions* | |
| | Cuyo | **0.2681** | 0.38 |
| | GBA | 0.197 | **3.53** |
| | North-est | **0.2378** | 0.66 |
| | North-west | 0.2148 | 0.69 |
| | Pampeana | 0.2136 | **1.93** |
| | Patagonia | 0.191 | 0.13 |
| | | *# of Salaries* | |
| | 0 | **0.3897** | 0.64 |
| | 1 | 0.212 | **4.18** |
| | 2 | 0.1746 | **1.77** |
| | 3 | 0.2084 | 0.56 |
| | 4 | 0.1992 | 0.16 |
| | 5 | 0.1783 | 0.01 |
| | 6 | 0.3741 | 0.01 |
| | 7 | 0.198 | 0 |

Let us analyse the multidimensional decomposition of this multi-

level decomposition. The values of the *UPI* are presented in table 6. All the sub-populations are affected, though at different degrees, by the dimension $(X_9)$: pension and others benefits for the employed person, $(X_{10})$: the educational level, $(X_1)$: the household income level (except for sub-group of households with five income earners, $(X_2)$: the household size (except for beneficiaries over 65 years), and $(X_6)$: the occupancy title of the residence household (except for households with seven income earners).

**Table 6**

*UPI by Attribute and by Different Multi-Level Decomposition*

| Partitions | $X_1$ | $X_2$ | $X_3$ | $X_4$ | $X_5$ |
|---|---|---|---|---|---|
| *JJH Beneficiaries* | | | | | |
| Man | 0.7781 | 0.3605 | 0.0423 | 0.0554 | 0.0478 |
| Woman | 0.7075 | 0.2519 | 0.0940 | 0.1076 | 0.0436 |
| <25 | 0.7891 | 0.2838 | 0.1104 | 0.3056 | 0.1012 |
| 25-45 | 0.7495 | 0.3674 | 0.0748 | 0.0630 | 0.0398 |
| 45-65 | 0.7116 | 0.2304 | 0.0263 | 0.0208 | 0.0421 |
| >65 | 0.8604 | 0.0000 | 0.0105 | 0.0302 | 0.0000 |
| Single | 0.8066 | 0.3138 | 0.1116 | 0.1610 | 0.0550 |
| Couple | 0.7465 | 0.4410 | 0.0811 | 0.1119 | 0.0762 |
| Married | 0.7292 | 0.2999 | 0.0336 | 0.0372 | 0.0270 |
| Divorced | 0.7422 | 0.1890 | 0.0729 | 0.0598 | 0.0382 |
| Widower | 0.7435 | 0.2476 | 0.0241 | 0.0290 | 0.0175 |
| Cuyo | 0.7830 | 0.3969 | 0.0707 | 0.1529 | 0.2512 |
| GBA | 0.7288 | 0.2804 | 0.0647 | 0.0569 | 0.0322 |
| North-est | 0.7881 | 0.4083 | 0.0998 | 0.1442 | 0.0728 |
| North-west | 0.7270 | 0.3447 | 0.0515 | 0.1513 | 0.0299 |
| Pampeana | 0.7757 | 0.3256 | 0.0609 | 0.0651 | 0.0375 |
| Patagonia | 0.7174 | 0.3074 | 0.0196 | 0.0322 | 0.0585 |
| 0 | 1.0000 | 0.2522 | 0.2360 | 0.2225 | 0.0546 |
| 1 | 0.9008 | 0.3227 | 0.0713 | 0.0924 | 0.0475 |
| 2 | 0.5486 | 0.2519 | 0.0147 | 0.0453 | 0.0366 |
| 3 | 0.3629 | 0.4598 | 0.1207 | 0.0182 | 0.0614 |
| 4 | 0.3261 | 0.4517 | 0.0000 | 0.0494 | 0.0405 |
| 5 | 0.0477 | 0.6499 | 0.0000 | 0.0000 | 0.0273 |
| 6 | 0.3424 | 1.0000 | 0.0000 | 0.0000 | 1.0000 |
| 7 | 0.2774 | 1.0000 | 0.0000 | 0.0000 | 0.0000 |

**Table 6**

(*continued*)

| *Partitions* | $X_6$ | $X_7$ | $X_8$ | $X_9$ | $X_{10}$ |
|---|---|---|---|---|---|
| *JJH Beneficiaries* | | | | | |
| Man | 0.2850 | 0.0568 | 0.0000 | 0.9803 | 0.8182 |
| Woman | 0.2551 | 0.0622 | 0.0000 | 0.9772 | 0.7763 |
| <25 | 0.6150 | 0.0860 | 0.0000 | 0.9976 | 0.7658 |
| 25-45 | 0.2403 | 0.0462 | 0.0000 | 0.9777 | 0.7623 |
| 45-65 | 0.2136 | 0.0524 | 0.0000 | 0.9728 | 0.8840 |
| >65 | 0.1462 | 0.2930 | 0.0000 | 0.9895 | 1.0000 |
| Single | 0.2805 | 0.0617 | 0.0000 | 0.9829 | 0.7060 |
| Couple | 0.3550 | 0.0427 | 0.0000 | 0.9908 | 0.8395 |
| Married | 0.2285 | 0.0620 | 0.0000 | 0.9714 | 0.8174 |
| Divorced | 0.2621 | 0.0820 | 0.0000 | 0.9683 | 0.7442 |
| Widower | 0.1311 | 0.0245 | 0.0000 | 1.0000 | 0.9504 |
| Cuyo | 0.5477 | 0.0215 | 0.0000 | 0.9465 | 0.7760 |
| GBA | 0.1846 | 0.0489 | 0.0000 | 1.0000 | 0.8137 |
| North-est | 0.2956 | 0.0437 | 0.0000 | 0.9804 | 0.8103 |
| North-west | 0.2871 | 0.0583 | 0.0000 | 0.9804 | 0.7460 |
| Pampeana | 0.3916 | 0.0899 | 0.0000 | 0.9413 | 0.7967 |
| Patagonia | 0.2345 | 0.0646 | 0.0000 | 0.9832 | 0.7465 |
| 0 | 0.4795 | 1.0000 | 0.0000 | 0.9417 | 0.9416 |
| 1 | 0.2754 | 0.0187 | 0.0000 | 0.9793 | 0.7737 |
| 2 | 0.2248 | 0.0050 | 0.0000 | 0.9888 | 0.7996 |
| 3 | 0.1941 | 0.0000 | 0.0000 | 0.9722 | 0.9361 |
| 4 | 0.6423 | 0.0000 | 0.0000 | 0.9430 | 0.6777 |
| 5 | 0.1090 | 0.0000 | 0.0000 | 1.0000 | 1.0000 |
| 6 | 0.3000 | 0.0000 | 0.0000 | 1.0000 | 1.0000 |
| 7 | 0.0000 | 0.0000 | 0.0000 | 1.0000 | 1.0000 |

3.2.3. The $\alpha$-cut Multi-Level Decomposition

The last multi-level decomposition used the $\alpha$-cut property of fuzzy set theory. We have calculated the multidimensional poverty index for each household included in the database. Then, the state of poverty of the households was ordered by decreasing values. Thus, the second

partition decompose the population into four sub-groups according
to the intensity of poverty of each household: one containing the
poorest 10% of the Argentine population; the next containing those
households which are between the 10% and 25% poorest; the third
group contained households which are between the 25% and 50%
poorest, while the last group contained households with a poverty
index above 50%.

Table 7 presents the multidimensional poverty index for each
sub-group of population and their relative contribution level to the
global MPI. Given that the second partition considers percentiles of
population, what is interesting in this decomposition is to study the
contributions levels of each attribute to explain the poverty level of
each sub-group (see table 8). The intensity of poverty of the poorest
10% is explained as follows: 29.4% come from pension and other ben-
efits for the employed person ($X_9$), 14.67% from water facilities ($X_3$),
and 11.5% from the size of the household ($X_2$). For the subgroup of
the 10% to 25% poorest the contributions are as follows: pension and
other benefits for the employed person ($X_9$: 51.61%), the household
size ($X_2$: 17.53%) and the household income level ($X_1$: 10.03%). For
the group of the 25% to 50% poorest the contributions are: pension
and other benefits for the employed person ($X_9$: 73.01%), the level of
education of the reference person ($X_{10}$: 12.29%) and the household
equivalent income ($X_1$: 11.96%). Finally for the 50% richest house-
holds the contributions are: 31.6% is explained by the income level
($X_1$), 27.61% by the educational level of the reference person ($X_{10}$)
and 25.79% by pension and other benefits for the employed person
($X_9$).

**Table 7**

*MPI by Sub-Group of Population and*
*Their Relative Contribution to MPI*

| First Partition | Second Partition (%) | MPI by Sub-Group of Population | Relative Contribution to MPI |
|---|---|---|---|
| *JJH* | 10 | **0.3281** | **3.51** |
| Beneficia- | Population  10-25 | 0.1873 | **2.13** |
| ries | Percentiles  25-50 | 0.1312 | 1.67 |
| | 50-100 | 0.0565 | 0.01 |

**Table 8**

*UPI by Attribute and by Sub-Group of Population*

| Partitions | | $X_1$ | $X_2$ | $X_3$ | $X_4$ |
|---|---|---|---|---|---|
| | 10% | 0.7904 | 0.527 | 0.2118 | 0.2556 |
| | | [5.68] | **[11.52]** | **[14.67]** | **[10.39]** |
| *JJH* | 25% | 0.7976 | 0.4578 | 0.0000 | 0.0000 |
| | | **[10.03]** | **[17.53]** | [0.00] | [0.00] |
| Part. | 25-50% | 0.6664 | 0.0102 | 0.0000 | 0.0000 |
| | | **[11.96]** | [0.56] | [0.00] | [0.00] |
| | 50-100% | 0.7573 | 0.0518 | 0.0000 | 0.0000 |
| | | **[31.60]** | [6.58] | [0.00] | [0.00] |

| $X_5$ | $X_6$ | $X_7$ | $X_8$ | $X_9$ | $X_{10}$ |
|---|---|---|---|---|---|
| 0.1345 | 0.5591 | 0.1698 | 0.0000 | 0.9869 | 0.8414 |
| [6.41] | **[10.39]** | [5.91] | [0.00] | **[29.40]** | [5.63] |
| 0.0146 | 0.2634 | 0.0203 | 0.0000 | 0.9892 | 0.8365 |
| [1.22] | [8.57] | [1.24] | [0.00] | **[51.61]** | [9.81] |
| 0.0001 | 0.0431 | 0.0019 | 0.0000 | 0.9804 | 0.7345 |
| [0.02] | [2.00] | [0.16] | [0.00] | **[73.01]** | **[12.29]** |
| 0.0161 | 0.0367 | 0.0000 | 0.0000 | 0.149 | 0.7101 |
| [4.46] | [3.96] | [0.00] | [0.00] | **[25.79]** | **[27.61]** |

Note: [.] relative contribution to global MPI.

This is a very important result because more than 70% of *JJH* beneficiaries belong to the poorest 25% of the population. This multidimensional decomposition shows that the principal dimension that generates structural poverty among the *JJH*–beneficiary group, and for all $\alpha$-cut decompositions, is not necessarily the monetary one. For the two poorest sub-groups of the population, the household equivalent income is not one of the major contributions to the intensity of poverty of the various sub-populations. Thus, decision makers must take into account the characteristics of poverty of this group of the population before proposing socio-economic policies aiming at reducing poverty.

## 4. Conclusion

This article analyzes the impact of the *Plan Jefes y Jefas de Hogar Desocupados* on structural poverty, and the main characteristics of

poverty of the *JJH* beneficiaries, using a multidimensional approach of poverty based on fuzzy set theory and its decomposition properties. This social assistance program was introduced in January 2002 as a response to the severe economic and political crisis that affected Argentina at the end of 2001. An income transfer of $150 was proposed to an unemployed reference person of households with dependents under the age of 18 or with disabled individuals of any age.

A first result of our study is that the impact of the *JJH* program on the monetary aspect of poverty is minor. Its impact on employment is uncertain, because it is not clear whether it generated new jobs.

The multi-level decompositions showed that the poorest subgroups of beneficiaries consist mainly of women, those less than 45 years old, the single and those living as a couple but not married, and those living in the North of Argentina. The unidimensional poverty indexes calculated for each sub-population showed that the important characteristics of poverty are pension and other benefits for the employed person, the educational level of the reference person, the household income, the size of the household and the occupancy title of the household.

Another important result of this paper is that more than 70% of *JJH* beneficiaries belong to the poorest 25% of the population, and for this poorest sub-group of population, household equivalent income does not seem to be one of the major determinants of poverty. Policy makers must therefore take into account this information before designing socio-economic policies aiming at reducing the level of social exclusion.

Six years after the crisis, the *JJH* program continues to be offered to Argentinean households. In spite of this monetary transfer, the final income level of its beneficiaries is not high enough to allow them to exit from poverty. The significant intensity of poverty and unemployment becomes a structural problem in this country, and even though we cannot deny that the *JJH* program plays an important role in improving the quality of life of those socially excluded, the program has only a small effect on overall poverty. Clearly this type of assistance program does not solve the problem of the intergenerational transmission of structural poverty.

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## Appendix A.I: Degree of Membership of the Socio-Economic Attributes

**Table A.I.1.**

*Household Equivalent Income*[1]

| Income Level ($y_i^e$) | | Degree of Membership |
|---|---|---|
| If | $y_i^e \leq y_{0.15}^e$ | 1 |
| If | $y_{0.15}^e < y_i^e \leq y_{0.60}^e$ | $(y_{0.60}^e - y_i^e)/(y_{0.60}^e - y_{0.15}^e)$ |
| If | $y_i^e > y_{0.60}^e$ | 0 |

**Table A.I.2.**

*Household Size: $\sigma$ = Number of Household Members/Number of Rooms in the House*[2]

| Ratio ($\sigma$) | Degree of Membership |
|---|---|
| $\sigma \leq 1$ | 0 |
| $1 < \sigma \leq 2$ | 0 |
| $2 < \sigma \leq 3$ | 0.5 |
| $\sigma > 3$ | 1 |

**Table A.I.3.**

*Access to Water*

| Water | Degree of Membership |
|---|---|
| Has access to water | 0 |
| Does not have access to water | 1 |

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[1]  Where $y_{0.15}^e$ and $y_{0.60}^e$ are the equivalent income for the 15th and 60th percentile, respectively.

[2]  We have not considered the bathrooms or the kitchen.

**Table A.I.4.**

*Toilet Characteristics*

| Characteristics | Degree of Membership | |
|---|---|---|
| The toilet | Has | Has not |
| Has running water | 0 | 1 |
| Has no running water | 0.75 | 1 |
| Is a latrine | 1 | 1 |

**Table A.I.5.**

*Materials Used in Construction*
*of the House (The Main Walls)*

| Materials | Degree of Membership |
|---|---|
| Masonry (brick, concrete, and others) | 0 |
| Wood | 0.25 |
| Metal or fibrocement | 0.50 |
| Adobe | 0.75 |
| Carton or waste | 1 |
| Others | 1 |

**Table A.I.6.**

*Occupancy Title and Location of the Household Residence*

| Occupancy Title and Location of the Household Residence | Owner of the House and Terrain | Owner of the House Only | Rented |
|---|---|---|---|
| House | 0 | 0.3 | 0.4 |
| Apartment | 0 | 0.3 | 0.4 |
| House residence at work | 0 | 0.4 | 0.5 |
| Rooms for rent | 0 | 0.6 | 0.6 |
| Hotel | 0 | 0.6 | 0.75 |
| Non ability houses | 0.5 | 0.8 | 0.9 |
| Run-down Neighbourhood | 0.7 | 1 | 1 |

**Table A.I.6.**
(*continued*)

| Occupancy Title and Location of the Household Residence | Occupied Under Redemption Agreement | Occupied Free of Charge |
|---|---|---|
| House | 0.5 | 1 |
| Apartment | 0.5 | 1 |
| House residence at work | 0.6 | 1 |
| Rooms for rent | 0.7 | 1 |
| Hotel | 0.8 | 1 |
| Non ability houses | 0.9 | 1 |
| Run-down Neighbourhood | 1 | 1 |

**Table A.I.7.**
*Ratio of the Household Members with Income to Household Size*[3]

| Number of Rooms of the House | Value of the Ratio | Degree of Membership |
|---|---|---|
| 1 | 0 | 1 |
| 1 | 1 | 0 |
| 2 | 0 | 1 |
| 2 | $\geq 0.5$ | 0 |
| 3 | 0 | 1 |
| 3 | $\geq 0.33$ | 0 |
| 4 | 0 | 1 |
| 4 | 0.25 | 0.4 |
| 4 | $\geq 0.5$ | 0 |
| 5 | 0 | 1 |
| 5 | 0.2 | 0.5 |
| 5 | $\geq 0.4$ | 0 |
| 6 | 0 | 1 |
| 6 | 0.16 | 0.75 |

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[3] Degree of membership proposed by Dagum and Costa (2004) for this attribute.

**Table A.I.7.**
(*continued*)

| Number of Rooms of the House | Value of the Ratio | Degree of Membership |
|:---:|:---:|:---:|
| 6 | 0.33 | 0.25 |
| 6 | ≥ 0.5 | 0 |
| 7 | 0 | 1 |
| 7 | 0.14-0.29 | 0.75 |
| 7 | 0.3-0.58 | 0.25 |
| 7 | > 0.58 | 0 |

**Table A.I.8.**
*Stability of Occupation of the Reference Person*[4]

|  | Degree of Membership | | |
|:---:|:---:|:---:|:---:|
|  | < 25 years old | 25-65 years old | > 65 years old |
| *Male employed head of household* | | | |
| Permanent | 0 | 0 | 0 |
| Temporary | 0.1 | 0.1 | 0 |
| Unknown | 0.2 | 0.3 | 0.1 |
| Little job | 0.4 | 0.5 | 0.1 |
|  | | | |
| Male unemployed head of household | 1 | 1 | 1 |
| Male inactive | 0.5 | 0.6 | 0.2 |
|  | | | |
| *Female employed head of household* | | | |
| Permanent | 0 | 0 | 0 |
| Temporary | 0.1 | 0.2 | 0 |
| Unknown | 0.2 | 0.4 | 0.1 |
| Little job | 0.4 | 0.6 | 0.1 |

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[4] We adapted the degree of membership proposed by Dagum and Costa (2004) for this attribute.

**Table A.I.8.**
(*continued*)

|  | Degree of Membership | | |
|---|---|---|---|
|  | < 25 years old | 25-65 years old | > 65 years old |
| Female unemployed head of household | 1 | 1 | 1 |
| Female inactive | 0.5 | 0.8 | 0.2 |

**Table A.I.9.**
*Pension and Other Benefits of the Employed Person*[5]

| Pensions and Others | Degree of Membership |
|---|---|
| Pension only | 0.5 |
| Combinations with pension | 0.25 |
| Combinations without pension | 0.9 |
| All the benefits | 0 |
| Without any benefit | 1 |
| Employed without salary | 1 |
| Unemployed | 1 |

**Table A.I.10.**
*Highest Level of Education*
*Completed by the Reference Person*

| Level of Education | Degree of Membership |
|---|---|
| None | 1 |
| Primary school | 1 |
| National school | 0.5 |
| Commercial school | 0.5 |
| Normal school | 0.5 |
| Technical school | 0.25 |

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[5] The benefits are: holiday's periods, worker compensation, pension, social security and dismissal's indemnity.

**Table A.I.10.**

(*continued*)

| Level of Education | Degree of Membership |
|---|---|
| Others | 0.25 |
| Associate' s university degree | 0.1 |
| University studies | 0 |

**Appendix A.II: Equivalent Scales[6]**

**Table A.II.1.**

*Values of the Equivalent Scale*
*Used in the Present Article[7]*

| Household Size | Equivalent Scale |
|---|---|
| 1 person | 73 |
| 2 persons | 82 |
| 3 persons | 91 |
| 4 persons | 100 |
| 5 persons | 109 |
| 6 persons | 118 |
| 7 persons or more | 127 |

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[6]  See Dagum and Costa (2004) for more details on this method.

[7]  The database used for this estimation comes from the expenditure of household survey proposed by the World Bank for Argentina in 2002.