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A Social Accounting Matrix and EU-SILC data to assess the impact of social policies funded by oil royalties

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Abstract

According to the concept of "weak" sustainability, exploited natural capital should be replaced with other produced assets, such as social capital, to ensure non-declining welfare dynamics. One way to promote the accumulation of social capital is to use revenues from the exploitation of natural resources for social welfare policies. Better ex-ante and ex-post assessment of policies is needed in order to optimize the use of resources, especially when revenues from the use of a non-renewable natural resource such as oil are used to foster development in poor countries and lagging regions.
The aim of this work is to assess the impact on income distribution of a social card funded by oil royalties to support the income of poor families in the Basilicata region, Italy. The direct and indirect distributive effects of this policy are assessed by combining microeconomic information from the European Survey on Incomes and Living Conditions (EU-SILC) with a multi-sector model of the regional economy based on a two-region social accounting matrix (SAM). The analysis has shown that the EU-SILC data sample, combined with a SAM multi-sector model, can be used to support the study of regional policies, and this is a promising result for the future development of research.

Keywords: weak sustainability, oil royalties, social welfare, EU-SILC, SAM, poverty and inequality indicators.

JEL code: I3, Q01, Q35, R15, R58

1 Introduction

The use of natural resources should be sustainable, since sustainable development can be defined as “a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations” (Hediger, 2000; WCED, 1987).

This is especially true in the case of non-renewable natural resources. According to the concept of "weak" sustainability, exploited natural capital should be replaced with other produced assets to ensure non-declining welfare dynamics (Hamilton and Atkinson, 2006). The exploitation of non-renewable natural resources is also likely to generate adverse distributive impacts linked to the structure of property rights, unequal access to capital and technologies, and territorial distribution of the resources themselves. Consequently, the replacement of exploited non-renewable natural resources should also include the reproduction of social capital, defined as “a society’s capability to deal with social, economic and environmental problems and be active in shaping the development of the overall system” (Berkes and Folke, 1994; Hediger, 2000).

One way to promote the accumulation of social capital is to use revenues from the exploitation of natural resources for social welfare policies. There is a widespread consensus around the idea that social and poverty-reducing policies also foster economic growth (Ravallion, 2007, 2009; Scarlato, 2010). Furthermore, a reduction in inequality may increase the duration of growth periods (Berg et al, 2012). Scarlato (2010) highlights two interesting aspects linking inequality and poverty to economic growth: (i) vulnerable social groups face great uncertainty about the future, and this shortens the time horizon of their choices, therefore an effective social protection system may reduce the risk, increasing incentives to invest in physical and human capital and improving the allocation of resources; (ii) growth is fueled by social capital that a cohesive society produces, but because social balances are continually destabilised, and uncertainty and risk dominate the new international scenario, social cohesion needs to be maintained by a social protection system that ensures an acceptable level of equity.

Basilicata region in southern Italy offers an example of how revenues from the exploitation of a non-renewable natural resource can be used in socio-economic development policies (Viccaro et al., 2015). In this case, oil royalties are used to fund actions aiming at strengthening the competitiveness of the production system and improving the quality of life in the areas affected by oil extraction, according to a “weak” approach to sustainability.

Among the various measures funded by oil royalties, the introduction of a social card is particularly interesting. This tool is similar to new instruments adopted in social welfare policies (Scarlato, 2010), which are becoming increasingly popular at the international level, since they allow weaker social groups to access goods and services. They are used in social welfare policies to tackle poverty and reduce inequality to promote and strengthen social capital.

A major problem of social policies is the difficulty of evaluating their effects. Very often a great deal of attention is paid to used resources, and little to outcomes (Scarlato, 2010). Such

a problem is recognised at the international level, and the Paris Declaration emphasizes the need to focus aid policies on outcomes as measurements of performance (OECD, 2015; Scarlato, 2010).
Updated policy evaluation methods (Ravallion, 2008) are based on the assumption that the impact of support should be monitored not only at the macroeconomic level, but that microeconomic techniques should also be used to obtain insights into the mechanisms by which policies produce their effects. The methods of impact analysis based on counterfactual logic (Banerjee and Duflo, 2008) are useful to verify the effectiveness of actions step-by-step and to measure the impact of interventions on social welfare (Baird et al., 2010).
In addition, better ex-ante assessment of policies is needed in order to optimize the use of resources. This is especially true when revenues from the use of a non-renewable natural resource such as oil are used to foster development in poor countries and lagging regions (Viccaro et al., 2015). The priority for decision-makers is to focus better on strategic objectives to promote long-term sustainable socioeconomic development, while compensating for the depletion of environmental assets resulting from the exploitation of a non-renewable resource.
The aim of this work is to assess the impact on income distribution of a social card funded by oil royalties to support the income of poor families in Basilicata Region, Italy.
The direct and indirect distributive effects of this policy are assessed by combining microeconomic information from the European Survey on Incomes and Living Conditions (EU-SILC) for Basilicata with a multi-sector model of the regional economy based on a two-region social accounting matrix specially tailored to Basilicata. The social outcomes of the regional policy are described through the analysis of some poverty and inequality indicators.

2 Royalties used to finance social welfare policies in Basilicata Region

Basilicata is the typical case of a region that has fallen behind the rest of the national economy. Despite having the largest onshore oil field in Europe, Basilicata's economy is in severe difficulty compared with the rest of the country.
When oil fields were discovered in the Agri Valley (south-western Basilicata) in the early 1990s, they were seen as an important opportunity for the regional economy. Under the agreement between the Italian State and oil companies, above a small given output threshold, companies must transfer 7% of their earnings to local government (Region and municipalities) of the drilling area in the form of royalties (Ministero dello Sviluppo Economico, 2015a). From the start of drilling in 1997 until the end of 2015 the local government received over €1.35 billion in royalties (2015 prices). In addition, a recent national regulation (No. 99/2009) allocates an additional 3% of earnings to a special income support system for Basilicata households via the introduction of a "social card".
Surprisingly, oil earnings have not had a great impact on the local economy, despite the huge amount of additional financial resources channeled into regional development policies (Iacono, 2015; Rocchi et al., 2015; Viccaro et al., 2015). This revenue has undoubtedly mitigated the impacts of the overall macroeconomic crisis after 2007, but the absence of a

clear strategy to increase the competitiveness of the regional economic system might actually worsen Basilicata's position within the national economy. Furthermore, Rocchi et al. (2015) showed that a structural trade-off exists in Basilicata's economy between growth and equity. Due to the structure of the regional economy, use of oil revenues to improve economic growth is also likely to have negative effects on distribution in the short-run, such as increased inequality and asymmetry between urban and rural households in terms of income distribution.

Sustainable management of oil revenues should aim at achieving a good balance between investment programs directed at improving the performance of the regional economy in the long term, and social transfers compensating the adverse effects of growth on income distribution. From this point of view, the introduction of a "social card" may be a promising policy tool for the Basilicata regional government.

These additional resources were first used in 1999 as fuel vouchers. Article no. 45 of Law No.99/2009 established a fund to finance a social card used for «… fuel discounts at filling stations …» (Ministero dello Sviluppo Economico, 2015b). The Fuel Card was initially issued only to Basilicata residents aged over 18 who held a driving license, but the regulations about the bonus and its beneficiaries have changed over the years (Ministero dello Sviluppo Economico, 2015b).

Initially, fixed per capita payments were based on the available funds and on the total number of driving license holders. Subsequently, the system was extended to include all Basilicata residents aged over 18, and the payment differentiated according with income level, so that those with higher incomes receive less and those with lower incomes receive more benefit.

For the card to work as a genuine social card, however, this type of income support should not be restricted to fuel purchases. For this purpose, a preliminary agreement in March 2015 between the Ministero dello Sviluppo Economico and the regional government of Basilicata allows the regional government to issue a Social Card essentially aimed at providing income support for disadvantaged households.

The analysis below will assess the effectiveness of the initial Fuel Card system as an income re-distribution policy. It will also propose an ex-ante assessment of the possible impact of alternative ways of providing income support.

3 Data and Methods

3.1 Data

The assessment of the impacts of social policies on poverty and inequality is based on microeconomic information taken from the European Union Survey on Incomes and Living Conditions (EU-SILC), an annual household survey carried out in EU member states and other European countries (Eurostat, 2013). It gathers information on approximately 450 variables referring to demographics, income and living conditions. Most notably, EU-SILC serves as a database for measuring poverty risk and social cohesion in Europe (Eurostat, 2013).

This study used the 2011 EU-SILC micro-economic data for Italy to simulate the direct and indirect impact of alternative methods of distributing the social card fund, measured using poverty and inequality indicators.

The analysis was based on 11 variables taken from the original database providing information on the income, size and composition of households, as well as on the degree of urbanization of the geographical area of residence. From the initial sample of 19,578 observations was extracted a sub-sample of Basilicata households consisting of 398 observations. Based on these data, we envisaged alternative procedures for distribution of the social card fund to households. Firstly, distribution procedures were replicated according to the Fuel Card system (essentially based on distribution to all adults). This made it possible to describe allocation among different income deciles of households classified by equivalent per capita income. Subsequently, alternative systems were analysed which limited income support to poor (income below poverty threshold) and vulnerable (income close to poverty threshold) households.

These simulations based on micro-data enabled an assessment of the direct impacts of alternative income support systems on the income levels of potential beneficiary households. The analysis was also extended to include the indirect impacts of income support, taking into account the structure of the region's economic system. This result was obtained by associating the microeconomic dataset to a multi-sector model of the regional economy based on the Social Accounting Matrix (SAM) (Viccaro et al., 2015).

The SAM used in this study is a two-region (Basilicata vs. Rest of Italy) matrix referring to 2011. The flows between Basilicata and the rest of Italy are represented in great detail. The structure of the matrix includes 301 accounts; in each region the accounts are disaggregated among others into 37 production activities, 54 commodities, 23 consumption functions and into three types of institutions (households, firms and Government). Interestingly, the same EU-SILC data were used to disaggregate the household sector by income deciles in construction of the SAM.

The distribution by income deciles of the benefit allocated to households resulting from the simulation of different (actual and hypothetical) distribution scenarios on the microeconomic dataset was used to define suitable vectors of additional exogenous shock on final demand. The vector composition was defined according to the composition of final expenditure inside and outside Basilicata for each decile of households, as shown in the SAM. The implicit assumption of this procedure is that, given the small amount of payments, even in the case of support restricted to fuel purchases, the relative importance of fuel expenditure remains the same. The additional income thus generates a proportional increase in all purchased goods.

The indirect impact on household incomes of the additional expenditure on goods and services was calculated using the multiplier matrix derived from the SAM considering as exogenous accounts for capital formation, government and the rest of the world. The percentage increases in income, calculated for each income decile, have therefore been applied to the income of all the households included in the sample, thus obtaining a new measure of income. Consequently, the post-simulation income includes both the direct impact of card distribution and the further increase in income generated by the circular flow of the

economy, resulting from the use of the card for final consumptions. The integrated microeconomic dataset was used to calculate different poverty and inequality indicators before and after distribution of income support.
The main advantage of using a two-region model is the possibility of considering the rest of Italy as endogenous in the SAM model, making it possible to break down intraregional and interregional impacts (spillovers and feedbacks).

3.2 Robust estimates

Poverty and inequality indicators were calculated using the subsample of 389 observations referring to households in Basilicata. The small sample size and the structure of sample weights, designed to ensure unbiased estimates at the national level, required a robust approach to estimation.
The analysis was implemented in the open source statistical computing environment R (R Core Team, 2013), using the *laeken* add-on package (Alfons et al., 2013a). Unlike other available packages (Alfons, 2012; Alfons and Kraft, 2012; Lumley, 2012; Templ et al., 2013; Tillé and Matei 2012; Zardetto, 2012), *laeken* has been specifically developed to analyze EU-SILC data and provides functionality for standard and robust estimation of social exclusion and poverty indicators from complex survey samples (Alfons and Templ, 2013).
The basic idea for robust estimation is firstly to detect non-representative outliers among the selected observations, and secondly to reduce their influence on the estimates by either down-weighting the outliers and recalibrating the remaining observations, or by replacing the outlying values with values from a fitted distribution. The main advantage of this general approach is that it can be applied to any indicator that can be calculated from the available dataset (Alfons and Templ, 2013).
The *laeken* package includes recently developed methods (Alfons et al., 2013b) that allow sampling weights to be incorporated into a Pareto distribution model estimation. The data can be explored through suitable visualization techniques, such as the Pareto quantile plots (Alfons et al., 2013b; Beirlant et al., 1996). Furthermore, the user can detect and manage outlier observations by following alternative approaches. We used the Kerm rule (Kerm, 2007) to identify outliers and reduce their influence on the estimates, based on the *calibration of non-representative outliers* (CN) approach (Alfons et al., 2013b, Alfons and Templ, 2013). According to the CN approach, the sample weights of outliers are set to 1, as these observations are considered to be somewhat unique to the population data. The weights of the remaining observations are adjusted accordingly by calibration to reproduce the original sum of weights (Deville et al., 1993).
The Pareto Quintile Plot of the EU-SILC sub-sample for Basilicata is represented in Figure 1: in the upper right corner a single observation is the detected as an outlier.
Poverty and inequality indicators were estimated using the R package *ineq* (Zileis and Kleiber, 2015). A bootstrap procedure with 1000 replications was carried out using the R package *boot* (Canty and Ripley, 2015) to provide standard deviations and confidence intervals in order to test the robustness of produced estimates.

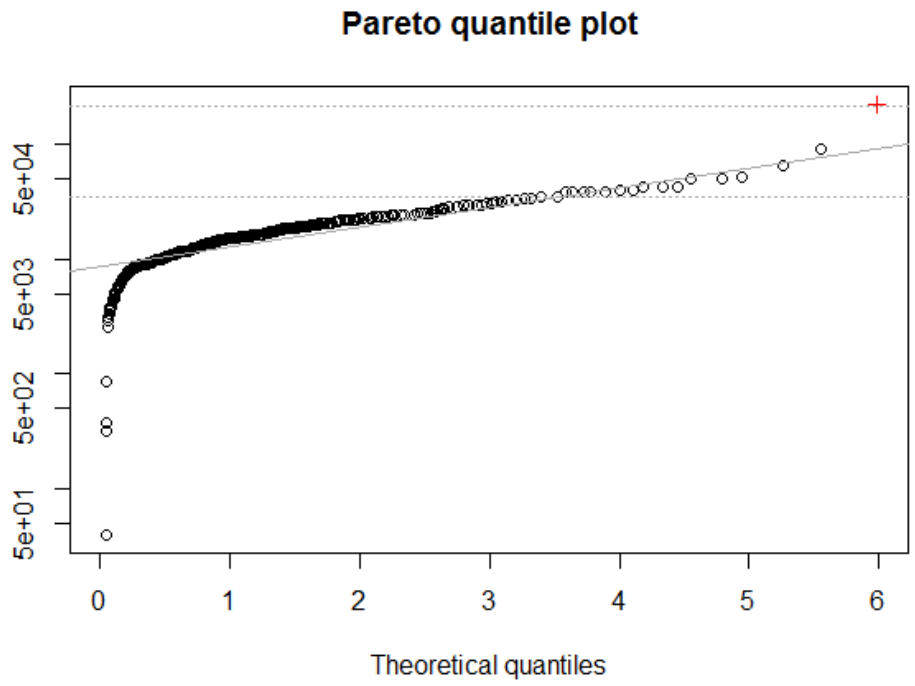

Figure 1. Income distribution of the EU-SILC regional sample according to Pareto distribution.

3.3 Poverty, vulnerability and inequality indicators

The following indicators were estimated from EU-SILC data based on equivalised per capita disposable income, defined as the total household disposable income divided by the equivalised household size, according to the modified OECD scale (OECD, 2013).

Relative poverty threshold. The relative poverty threshold (RPT) is set at 60% of the median equivalised disposable income:

$$RPT = 0.6 \times \hat{q}_{0.5} \quad (1)$$

where $\hat{q}_{0.5}$ is the median equivalised disposable income.

Absolute poverty thresholds. A household is judged to be in absolute poverty if it cannot afford the range of goods and services considered necessary to ensure a minimum acceptable standard of living (ISTAT, 2015a) in its reference area and according to the type of family. ISTAT calculates these thresholds every year, differentiated according to family size, composition and age, geographical distribution and the population of the municipality of residence (ISTAT, 2015b).

Based on these data and on information about family composition, a specific absolute poverty threshold was calculated for each sample observation, and the households in absolute poverty were identified.

Foster, Greer and Thorbecke indexes. Based on the relative poverty threshold we calculated the equation proposed by Foster, Greer and Thorbecke (World Bank, 2005), from which several indices are derived.

1. *Headcount index*. This is defined as the proportion of poor households with a disposable income below the relative poverty line.

2. *Poverty gap index*. This is the average poverty gap (where the "non-poor" have a poverty gap of 0). It may be seen as the indicator of the cost of eliminating poverty showing how much should be transferred on average to poor families in order to bring their income above the poverty line. The cost of eliminating poverty by perfectly targeted transfers is just the sum of all the poverty gaps of a population.
3. *Squared poverty gap ("poverty severity") index*. This poverty indicator measures inequality among the poor. It is the weighted sum of poverty gaps, where weights are individual poverty gaps: a poverty gap of 10% of the poverty line is given a weight of 10%, whereas a poverty gap of 50% is given a weight of 50%. The poverty gaps of the households furthest from the poverty line are given a greater weight; moreover, squaring the gap further increases the weight on the index value of the observations far below the poverty line.

Given the equation :

$$P_\alpha = \frac{1}{N} \sum_{i=!}^{N} \left(\frac{G_i}{z}\right)^\alpha \ , \ (\alpha \geq 0) \qquad (2)$$

where α is the measure of sensitivity of the poverty index, z is the relative poverty threshold, G_i is the poverty gap of the ith poor household (given by the difference between the relative poverty threshold and disposable income) and N is the sample size (number of households), we have:

- $\alpha = 0 \rightarrow P_0$ is the Headcount Index;
- $\alpha = 1 \rightarrow P_1$ is the Poverty Gap Index;
- $\alpha = 2 \rightarrow P_2$ is the Poverty Severity Index.

Gini coefficient. The Gini coefficient is the most widely-used index to analyse income distribution inequality (World Bank, 2005). It is based on a Lorenz curve, i.e. a cumulative frequency curve that compares the distribution of a specific variable (e.g. income) with a uniform distribution representing equity. The Gini coefficient is defined as the ratio of cumulative shares of the population arranged according to the level of equivalised disposable income to the cumulative share of their equivalised total disposable income.

3.4 Policy scenarios

Although aimed at income support, the policies involving the distribution of the fuel social card have often been criticised because they have not been effective in identifying income-deprived households. The outcome of our analysis has confirmed that there have been difficulties in targeting aid with fuel card distribution.

The first step in our study was to analyze the impacts of the policies applied so far, in which the social card is issued as a Fuel Card according to different scenarios:

1. *Fuel card I* (FC I scenario): flat payment only to driving license holders;
2. *Fuel Card II* (FC II scenario): decreasing payment by income band to driving license holders only;
3. *Fuel Card III* (FC III scenario): decreasing payment by income band to adults.

The available fund has been distributed among the households, not only according to the number of driving license holders and adults, but also based on the different income support

systems adopted so far (Ministero dello Sviluppo Economico, 2015b). In all three FC scenarios, the Fuel Card can be used by beneficiary households to make purchases inside and outside Basilicata.

Three additional scenarios in the distribution of income support were designed to represent the implementation of a genuine social card to contrast poverty and reduce inequality:

1. *Social Card I* (SC I scenario): progressive payments only to poor households. In this scenario individual payments are proportional to the share of individual to total poverty gap. In this system, the social card can purchase goods and services only in Basilicata;
2. *Social Card II* (SC II scenario): progressive payments only to poor and vulnerable households. Individual payments are proportional to the share of individual to total poverty gap, calculated according to a threshold equal to 70% of median income. In this scenario, the social card can purchase goods and services only in Basilicata;
3. *Social Card III* (SC III scenario): progressive payments only to poor and vulnerable households. Individual payments are proportional to the share of individual to total poverty gap, calculated according to a threshold equal to 70% of median income. With this system, the social card can purchase goods and services both inside and outside Basilicata, as in the three FC scenarios.

In order to make the results of different simulations comparable, we decided to consider the average amount of money allocated to the Fuel Card fund 2009-2013 as the income support fund to distribute among the different families, i.e. a total of €56 million per year.

4 Results

4.1 Baseline poverty profile

The data analysis shows (Table 1 and Figure 2) that in Basilicata in 2011 about 41,000 households (18%) were below the relative poverty threshold, whereas another 13,000 households (6%) were at risk of poverty (with an income of less than 70% of the median income).

Most poor households live in rural areas (84%), where there is also a high percentage of households at risk of poverty (57%) (Figure 3).

Table 1 shows a set of poverty and inequality indicators. Despite the small size of the sample, the variance of estimates is acceptable.

Table 1. Poverty and inequality indicators

Indicators	Baseline	Standard deviation	Coefficient of variation
Relative-poverty threshold (€)	7233	369	5.1%
RP Headcount ratio	17.7%	0.2%	1.1%
Poverty gap index	0.086	0.001	1.4%
Poverty severity index	0.065	0.001	1.7%
Gini index	0.332	0.001	0.4%

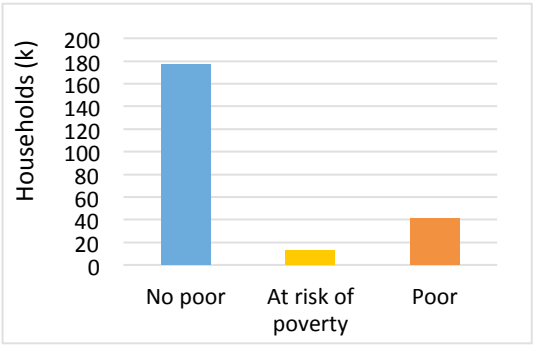

Figure 2. Classification of households based on the relative-poverty threshold

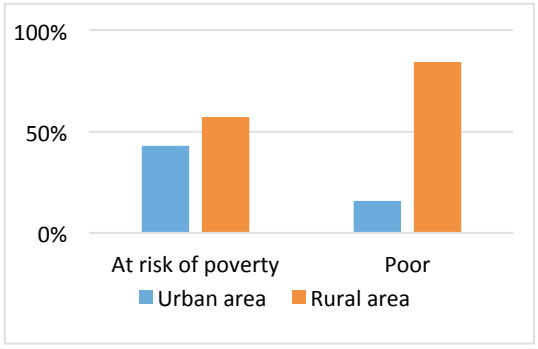

Figure 3. Distribution of poor households and households at risk of poverty by urban and rural areas

On average, the income of poor households should increase by 8.6% to reach the relative poverty thresholds (€7,233 per capita equivalent income). The poverty severity index is quite close to the poverty gap index, also showing inequality in income distribution within the poor group. The Gini index for the total population is about 33%, which is a relatively high level.
Considering the type and size of households (Table 2), it is evident that most poor households and households at risk of poverty consist of a single person, followed by households in which there are parents with two dependent children. Lastly, are households with no dependent children and with at least one member aged at least 65.
From the information available on household composition, it has been estimated that in 2011 12.54% i.e. 28,974 households were below the absolute poverty threshold.

Table 2. Incidence of relative poverty by household type and size

	Poor		At risk of poverty	
	No.	**%**	**No.**	**%**
Household type				
One-person household	15549	38.11	5562	42.52
2 adults, no dependent children, both adults under 65 years	2511	6.15	377	2.88
2 adults, no dependent children, at least one adult 65 years or over	3254	7.98	1563	11.95
Other households without dependent children	5019	12.30	902	6.90
Single-parent household, one or more dependent children	1764	4.32	479	3.66
2 adults, one dependent child	1140	2.79	781	5.97
2 adults, two dependent children	9521	23.34	2482	18.97
2 adults, three or more dependent children	239	0.58	-	-
Other households with dependent children	1801	4.41	933	7.13
Household size				
One member	15549	38.11	5562	42.52
Two members	6819	16.71	1941	14.84
Three members	4520	11.08	2162	16.53
Four members	13110	32.13	2482	18.97
Five or more members	799	1.96	933	7.13

4.2 Policy simulations

Based on the analysis of impacts, it is evident that for all simulated scenarios, new income generated is mostly due to use of the fuel or social card inside Basilicata (99%), and only to a minimum extent from its use in the rest of Italy (1%).

As shown in Table 3, the use of funds according to simulated scenarios SCs I and II would give much higher income increases in different deciles (0.13% - 0.23%) than they would according to the scenarios representing the policies actually applied (FC I, II and III), which give increases of 0.10% to 0.20%. This is because expenditure in the first case concerns goods and services purchased inside Basilicata, whereas in the second case some spending takes places in the rest of Italy, and this involves a loss of income indirectly due to the use of income support. This effect is confirmed by scenario SCIII, in which use of the card outside Basilicata reduces its impact on incomes.

Moreover, results show that all scenarios produce greater income increases among households in the higher decile groups, even for SC policies distributing aid only to the poor and vulnerable households in the lowest decile groups. This reflects the structural asymmetry in income distribution that is typical of Basilicata (Rocchi et al., 2015). This effect is confirmed in this case by the results of SC III where income support can be used both inside and outside Basilicata, but the overall impact is greater than the FC systems. This is because SC III is directed only at poor and vulnerable households, and these groups are more likely to spend money inside the regional borders.

Table 3. Percent increase of household income induced by the use of the social cards according to different scenarios

	Scenarios					
Decile	**FC I**	**FC II**	**FC III**	**SC I**	**SC II**	**SC III**
I	0.10	0.11	0.11	0.13	0.13	0.12
II	0.10	0.10	0.10	0.13	0.12	0.12
III	0.10	0.10	0.10	0.12	0.12	0.11
IV	0.10	0.10	0.10	0.12	0.12	0.11
V	0.14	0.14	0.14	0.15	0.15	0.14
VI	0.14	0.14	0.14	0.16	0.16	0.15
VII	0.16	0.16	0.16	0.18	0.18	0.17
VIII	0.18	0.18	0.18	0.20	0.20	0.18
IX	0.18	0.18	0.18	0.19	0.19	0.18
X	0.20	0.20	0.20	0.23	0.23	0.21

FC: fuel card scenario; SC: social card scenario

Table 4 shows the results of support on poverty and inequality simulated using the SAM model.

The first column shows the values of indicators in the baseline scenario, without any income support.

The use of the fuel card system, based on fund distribution according to the first policy (flat payments to driving license holders), corresponds to the scenario in the second column (FC I).

Table 4. Impact of the social card on poverty and inequality: current policies and alternative scenarios

	Scenarios						
	Baseline	**FC I**	**FC II**	**FC III**	**SC I**	**SC II**	**SC III**
Relative poverty threshold (€)	7,233	7,332	7,337	7,338	7,244	7,244	7,243
At-risk-of-poverty headcount ratio							
60% of median income (RPT)	17.7%	17.1%	17.1%	17.1%	17.7%	16.8%	16.8%
70% of median income	23.4%	23.2%	23.2%	23.2%	23.4%	23.4%	23.4%
Poverty gap index	0.086	0.085	0.085	0.085	0.064	0.066	0.066
Poverty severity index	0.065	0.062	0.062	0.062	0.036	0.039	0.039
Gini index	0.332	0.330	0.330	0.329	0.319	0.319	0.319
Absolute poverty headcount ratio	12.7%	11.2%	11.2%	11.2%	10.3%	9.1%	9.1%

FC: fuel card scenario; RPT: relative poverty threshold; SC: social card scenario

Unsurprisingly, its effects on income distribution are negligible. An almost identical situation is indicated by scenario FC II, corresponding to the second fund distribution system actually adopted, in which the fuel card is issued only to driving license holders, but according to income levels. This shows that the distribution policies adopted so far poorly target poor families and scarcely improve income distribution. Similar results would have been achieved by extending the fuel card to all adults, as hypothesised in the third scenario (FC III).

The three last columns represent hypothetical policy scenarios related to the implementation of a genuine Social Card. The indicators show a general improvement in the equality of income distribution. The Gini index decreases by 4% for all these distribution systems in comparison with the basic scenario, from 0.33% to 0.32%. This is mainly due to the reduction of inequality among the poor, actually improving the poverty severity index, as well as narrowing the poverty gap.

An interesting result is that if SC I policy were implemented, a 6.4% mean rise in income would be sufficient to allow households to escape poverty, although approximately 18% of households would still fall below the relative poverty threshold (60% headcount ratio). This is because the overall rise in income generated by income support raises the relative poverty threshold slightly, whereas the best targeting reduces inequality in income distribution among poor households, and has a positive impact on incomes, especially for the most disadvantaged households. This scenario gives the best result for the poverty severity index (0.036), reducing it by 44% compared to the Baseline.

Policies SC II and SC III also give income support to households at risk of poverty, and have a slightly different effect from SC I. Also in this case, the rise in income needed to allow all households to escape poverty would be lower than the baseline and equal to 6.6%. Increasing the number of beneficiaries to include vulnerable households, however, leads to better results in terms of reducing the absolute poverty index to 9.1% (-27%), which is approximately three times the effect of all FC I scenarios.

As already mentioned, in all the scenarios considered, the introduction of a fuel/social card leads to an overall increase in income that in turn causes a rise in the relative-poverty threshold. The raised poverty threshold means that the headcount ratio (60%) remains more or

less constant. Above all, better targeting of scenarios modifies overall inequality indicators (Gini index) and the Poverty Severity Index. In Figure 4 the robustness of this result is tested by comparing the Poverty Severity index in the Baseline scenario and in FC III (with the best targeting among FC scenarios) and SC II (with the best targeting among SC scenarios). The curves represent the Kernel Density Plot of the index estimates obtained by a bootstrap procedure.

The confidence interval in the FC III scenario basically overlaps that of the baseline, whereas the curve relating to scenario SC II is displaced significantly leftwards, with a reduced overlapping interval.

All scenarios have been simulated assuming that available funds were equal to the average amount distributed in the years of actual implementation (€56 M). To assess the effect of budget constraint on the results, we simulated the impact of scenario SC II on the proportion of households below the absolute poverty threshold as the budget increases (Figure 5).

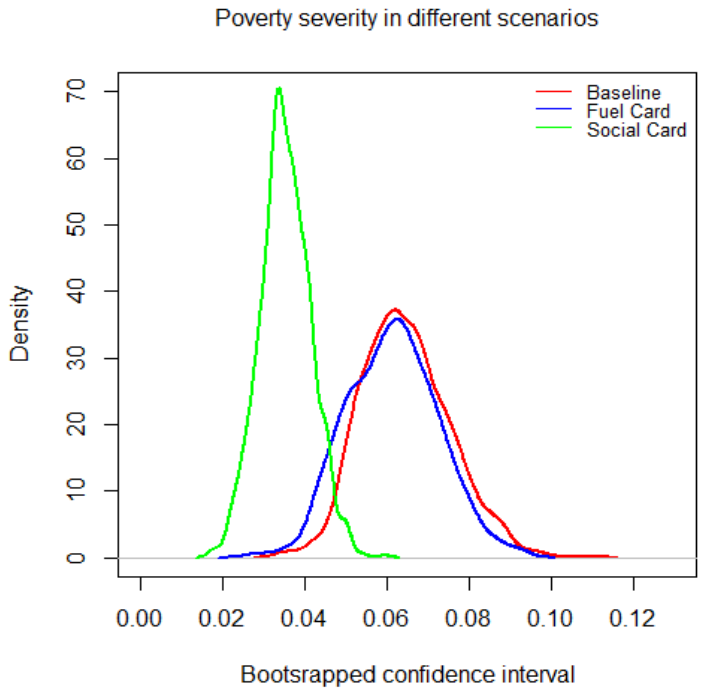

Figure 4. Confidence intervals of Poverty Severity Index estimates

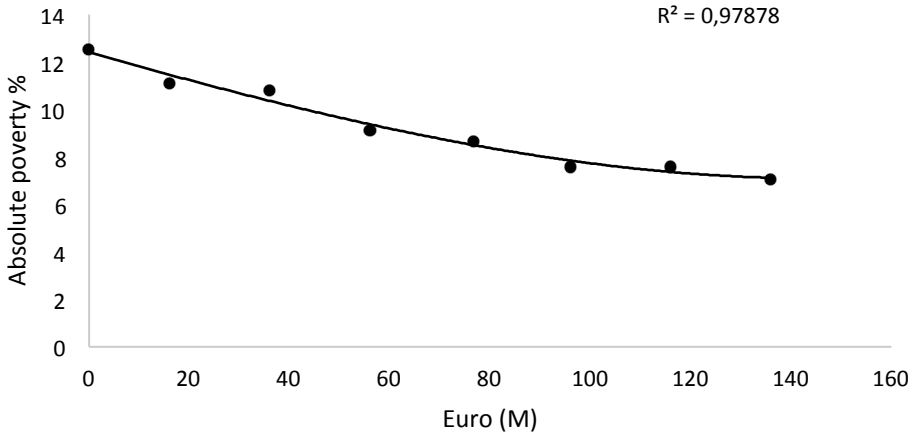

Figure 5. Absolute Poverty Headcount ratio with increasing budgets: SC II scenario

Figure 5 shows that the marginal effect of expenditure, given the structure of the policy envisaged, is decreasing, and that beyond €80 million the additional impacts are limited . This result confirms that the success of this social policy is strictly related to its effectiveness in addressing its direct and indirect impacts towards poorer households.

Table 5 compares the impacts on absolute poverty of the same policy scenarios shown in Figure 4, with two different amounts of funding available: the average distributed during the period 2009-2013 (€56.0 M) and the maximum distributed in a single year (€76.7 M in 2013).

Table 5. Impact on absolute poverty of different budgets: FC III vs SC II scenario

Baseline	**Available Budget**		**Scenarios**	
			FC III	**SC II**
Poor households				
Number	*€56.0 M*			
28974		*Absolute variation*	-3091	-7894
		HC % variation	-10.6%	-27.2%
Headcount Ratio	*€76.7 M*			
12.7%		*Absolute variation*	-3354	-8980
		HC % variation	-11.4%	-31.0%

FC: fuel card scenario; HD: headcount; SC: social card scenario

The data confirm and strengthen the results of Figure 5, proving that in order to make social policies more effective it is more important to properly define the target beneficiaries than increasing the amount of money available. An income support budget of only €56 million would reduce the households in absolute poverty by 27.2 % (- 7 894) in the case of SC II, against a reduction of just 10% (-3 091) for FCIII. The marginal impact of additional funds is strictly depends on the design of the implemented policy: increasing the budget by about 37% (+20.7 million euros) would increase the number of households leaving the state of absolute poverty from 7894 to 8980 (+13.7%) in scenario SCII, and from 3091 to 3354 (equal to about 8%) in scenario FC III. Similar differences in the impact of the two scenarios are recorderd in the variation of the Headcount Ratio.

5 Concluding remarks

This paper analyses the social policies implemented in Basilicata Region (southern Italy) using royalties from oil-drilling.

Basilicata is an underdeveloped region with non-renewable resources in the form of the largest on-shore oil field in Europe. The exploitation of these resources in a fragile and uncompetitive economic system poses major challenges for the long-term sustainability of the region's economic and social system. Following a weak sustainability approach, oil royalties should be used to improve the competitiveness of the regional system and for social policies aimed at correcting asymmetrical income distribution.

From 2009 to 2013, Basilicata spent about 30% of its oil royalties on Fuel Cards, distributing an annual average of €56 million according to different criteria for identifying eligible beneficiaries. The proposed analysis shows that the implemented policies have probably had a negligible impact on poverty and inequality indicators. However, this negative outcome does not depend on the absolute amount of funding available, but on an ineffective design of the implemented policies. The simulation of the impacts of different alternative policies has actually shown that an improved mechanisms for identifying beneficiaries would have given more relevant results from a social point of view. Although the amounts of money available would not be sufficient to completely resolve the problem of poverty in Basilicata, an appropriate targeting could significantly reduce the number of households below the poverty threshold (up to 27% fewer, considering the absolute poverty threshold and an annual fund availability corresponding to the average of the period). Moreover, income support concentrated on poorer households would significantly improve inequality indicators for the entire population (with a Gini index reduction of around 4%) and also for households below the poverty threshold (with a possible reduction of over 40% in the poverty severity index). Lastly, results show that appropriately targeted policies could have considerable effects even with a limited budget, thus avoiding a waste of resources that could be channeled into other kinds of development policies.

Some aspects of the methodology applied to this analysis deserve special attention. Results have been obtained using a multi-sectori model based on a Social Accounting Matrix referring to two-regions, Basilicata and the Rest of Italy, appropriately integrated with microeconomic data on household income from the EU-SILC survey for Italy. On one hand, the approach adopted has made it possible to improve the estimates of impacts on income distribution opposed to the simple use of the multi-sector model. On the other hand, the use of the multi-sectori model has made it possible to quantify even the indirect impacts on household incomes generated by income support systems, both inside Basilicata and in the form of inter-regional feedback.

The use of appropriate techniques has produced robust estimates of indicators, despite the small size of the sample of Basilicata households derived from the EU-SILC data. The most important results of the analysis can be considered reliable from a statistical point of view.

This analysis has shown that the EU-SILC sample can be used to support the analysis of regional policies, and this is a promising result for the future development of research. The availability of appropriate microeconomic data is very often one of the main constraints on

the implementation of evidence-based policies at the sub-national level. The possibility of using the EU-SILC survey significantly expands the prospects for research and reduces its costs. EU-SILC is an official annual survey directed to assessing the impacts of inclusion and social cohesion policies in the entire European Union. In addition to standard income-related indicators, it also measures a wide range of non-monetary indicators of well-being. These could provide an essential tool for designing social policies, making it possible to associate objective indicators (easy to use in the implementing phase) with the target income levels. Their use at the design stage would also enable the definition of an appropriate benchmark on which to base subsequent analyses of policy impact evaluation, according to an appropriate counterfactual logic.

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