Losing the Gains of the Past

The Welfare and Distributional Impacts of the Twin Crises in Iraq 2014

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Abstract

Iraq was plunged into two simultaneous crises in the second half of 2014, one driven by a sharp decline in oil prices, the other, by the war against the Islamic State in Iraq and Syria. The severity and recurrent nature of these crises demand a fast understanding and quantification of their welfare impact, which is critical for policy makers. This paper employs an innovative extension of the micro-simulation methodology to provide an ex ante estimate and analysis of the complex and dynamic poverty and distributional impact of the twin crises. The results show an almost complete erosion of the welfare gains of the past, with poverty falling back to 2007 levels and a 20 percent increase in the number of the poor. While the incidence of poverty is higher among internally displaced persons than the rest of the population (except in the Islamic State-affected governorates, where

poverty is higher), internally displaced persons make up only a small proportion of Iraq's eight million poor in 2014. The rest comprise of households who already lived below the poverty line, or those who have fallen below the poverty line in the face of the massive economic disruptions the country is facing. The welfare impact of the crises varies widely across space, with the largest increases in poverty headcount rates in Kurdistan and the Islamic State-affected governorates. Yet, the poorest regions in the 2014 crisis scenario are the same as in 2012, the currently Islamic State-affected, and the South, with poverty rates of 40 and 30 percent, respectively. Although the simulated results are not strictly comparable to ex post micro data estimates, because of survey coverage constraints, overall the results are very much in line, particularly in Kurdistan and the South.

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Losing the Gains of the Past: The Welfare and Distributional Impacts of the Twin Crises in Iraq 2014¹

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Introduction

Iraq was plunged into two simultaneous crises in the second half of 2014, one driven by a sharp decline in oil prices, the other, by the war against the Islamic State. Since June 2014, crude oil prices per barrel have fallen from around 112 USD to 97 USD in September and 62 USD by December (Figure 1). Given Iraq's heavy dependence on oil as a share of GDP and exports, and a source of government revenues, this decline in prices alone would have hit Iraq's fragile economy hard.

In addition, since June 2014, Islamic State (IS) or Da'ash militants extended their influence from Syria into Iraq's northern and western provinces of Anbar, Nineveh, Salahadin, and to a lesser extent, Kirkuk and Diyala. A total of 354,000 families were internally displaced between June and December of 2014 which represents about 2.1 million individuals;³ and those left behind have been cut off from the rest of the country. The internally displaced persons (IDPs) have sought refuge across Iraq and about half of those who have crossed governorate boundaries were settled in Iraqi Kurdistan.⁴

Civilian casualties in Iraq have increased to close to 2007 levels (Iraq Body Count) as a result of the ongoing violence (Figure 2). The prevailing insecurity has severely affected oil exports from the north, adversely impacted trade and investment, led to the destruction of infrastructure and impeded the flow of goods and services across the country, leading to a sharp contraction in oil and non-oil GDP (World Bank, Iraq Macro-Poverty Outlook (Internal Use Only), Spring 2015).

The twin crises are likely to have impacted households across Iraq through different transmission channels. Even for households directly affected by the war against IS, the welfare of those displaced, their hosting communities, and those left behind will all be affected differently.

On one hand, the consumption of IDPs could have been reduced by a decrease in the quality or flow of services received from housing as well as the loss of immobile durable goods and assets. Additionally, among the displaced, those previously employed in the private sector will have almost certainly lost their jobs and livelihoods. In contrast, IDPs who held public sector jobs have in general continued to receive their salaries and pensions.

For families left behind and still living in the IS-affected governorates of Anbar, Nineveh, and Salahadin, anecdotal evidence and discussions in country suggest that their access to services, Public Distribution System (PDS) and other public transfers has been disrupted, and that distorted markets have led to a local increase in prices. Moreover, their labor income might have also been reduced because of the economic disruptions, the security situation, and because of 'taxation' by Islamic State. All of these households including the IDPs could also have suffered from a reduction in their private transfers

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³ Source: IOM-OIM DTM Data January to December 25, 2014.

⁴ Kurdistan region comprises of the three governorates of Erbil, Sulaimaniya and Duhok. Based on official governorate boundaries, approximately 800,000 IDPs have moved to KR-I. If districts under de facto KR-I administration are included (in particular the IDP camps in Nineveh administered by the Duhok governorate), the number increases to 1 million. This influx represents a significant addition to Kurdistan's 5 million people.

(through domestic and international remittances) as a consequence of losing connection and communication with relatives and their larger social network.

On the other hand, among communities hosting significant IDP populations, it may be reasonable to assume greater competition for resources, within the labor market, and for goods, services and housing. These in turn may adversely affect the welfare of the hosting population.

While the IS crisis has impacted some regions more than others, the sharp decline in oil prices is expected to influence the whole economy: across economic sectors and regions. Oil is the main source of economic and fiscal resources in Iraq and it represents more than two-fifths of total GDP.⁵ Even though it directly accounts for only 1 percent of employment, oil revenues had enabled a significant expansion in public sector jobs between 2007 and 2012.⁶ The reduction in oil prices directly affects oil revenues and jeopardizes the sustainability of public jobs and public transfers across the country. As oil prices remain at low levels and economic growth slows down, household welfare would be impacted through different channels –the labor market through increases in unemployment, reduction in earnings or a combination of both; and through non-labor income components such as the decrease in public transfers such as pensions, rations received from the Public Distribution System and Social Safety Net transfers.

Given the severity of these crises, and the recurrent nature of such crises in Iraq (and increasingly in the Middle East and North Africa region), quantifying and understanding their welfare impact is critical for government and development partners. This paper employs an innovative extension of the micro-simulation methodology to provide an ex-ante estimate and analysis of the complex and dynamic poverty and distributional impact of the twin crises. In doing so, it examines how the population has been affected across the (income or consumption) distribution, assesses spatially differentiated impacts, estimates the effect of the crises through macro level shocks (operating through the macro economy) and the micro level shocks (primarily large scale internal displacement), predicts the poverty impact on the existing poor and those who have fallen into poverty (including internally displaced peoples (IDPs)), and compares the characteristics of these groups.

The paper is structured as follows: first, it presents the methodological approach, which differs from traditional ones –i.e. elasticity of poverty to output or GDP – and also from micro-simulation methods used in the past.⁷ Section II describes the macroeconomic inputs and assumptions behind each simulated scenario. Section III discusses the welfare and distributional impacts of the twin crisis in Iraq. Section IV presents some validation exercises using the Continuous IHSES collected in 2014. Section V concludes the study, summarizing key findings and discussing a few implications of the results for the country.

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⁵ Last official estimates, Crude oil represents about 44% of total GDP in 2014.

⁶ 80 percent of new jobs were created in the public sector, especially in the financial, insurance and professional services sector, with accompanying increases in wages and salaries between 2007 and 2012. Further details see World Bank (2015).

⁷ The findings of this paper represent ex-ante estimates based on available data and assumptions made after discussions and agreements with counterparts from the Government of Iraq and Kurdistan region, and as such do not constitute official estimates and may be updated when more recent and relevant data becomes available.

I. Methodological approach

The main challenge in fulfilling the objectives stated above is to find a way of translating these economic and demographic shocks into the consumption distribution. The traditional solution is to extrapolate poverty measures by estimating an “elasticity” of poverty to output or GDP. The elasticity approach uses historical trends of output and poverty to determine the responsiveness of poverty rates to growth in output (and consumption), which is then combined with macroeconomic projections to estimate the impact of future growth on poverty. Although this method is easy to implement, it is limited in its predictive capability since it yields only aggregate poverty impacts, with no indication of the broader distributional effects. It may also prove deficient in predicting poverty impacts during a macroeconomic event that affects output growth in a way that is not entirely consistent with the recent growth experience in Iraq. In addition, measured poverty has in recent times been very inelastic with respect to increases in GDP growth (as measured), so that elasticity approaches would imply little poverty impact of such a massive economic shock.⁸

The estimates and analysis presented in this paper uses a micro-simulation model to evaluate the welfare and distributional impacts of the IDPs and macro (oil price and non-IDP IS-related) crisis in Iraq during 2014. The micro-simulation model superimposes macroeconomic projections on behavioral models built on last available household survey (Iraq Household and Socio- Economic Survey, or IHSES 2012). The model is loosely based on previous approaches to micro-simulation described in Bourguignon, Bussolo and Pereira da Silva (2008) and Ferreira, et al. (2008) – with an important simplification of omitting the computable general equilibrium (CGE) component, which is difficult to employ in most developing countries. Instead the approach described here links the behavioral model to sectoral and aggregate macroeconomic data for Iraq, and extrapolates the microeconomic snapshot of a future scenario from this projection.⁹ This approach has been extended to explicitly take into account large scale population movements, which in the case of Iraq, is the internal forced displacement of people from the IS-affected provinces (or governorates).

This micro-simulation model accounts for multiple transmission mechanisms and captures impacts at the micro level across the income and consumption distribution. In particular, the model can take into account large changes in population over time and space; labor market adjustments in employment and earnings or a combination of both; non-labor incomes including public and private transfers; and price changes (including variations in food and non-food prices). These changes can be positive or negative, depending on the trends outlined by the macroeconomic inputs.

In the following subsections, we present a brief discussion about the micro-simulation model and each step in which this method is based -i.e. baseline, simulation and assessment- and we end the section with a discussion of the limitations and assumptions of this methodological approach.

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⁸ World Bank (2015)

⁹This approach was conceptualized, refined and tested in a diverse mix of countries not only during the financial crisis (such as Bangladesh, The Philippines, Mexico, Poland, and Mongolia) but also after the crisis (such as Costa Rica, Panama, Uruguay, Serbia, Armenia, Belarus, Kyrgyz Republic, Moldova, Poland, Romania, and Ukraine).

The micro-simulation model setup¹⁰

The micro-simulation is divided into three steps: the baseline, simulation and assessment. It is based on Olivieri S, et al. (2014) with a major difference of accounting for internal migration or population displacement.

Baseline

The first step is the process by which individual and household level information is used to estimate a set of parameters and unobserved characteristics for various equations of the household income generation model. The model behind the micro-simulation is the household income generation model developed by Bourguignon and Ferreira (2005). This model allows accounting for multiple transmission channels and working at the individual/household level. The first component of the model is an identity that defines the per capita income in a household h as the ratio between the total household income and the total number of members (n_h) in that household:

$$y_h = \frac{1}{n_h} \left[\sum_{i=1}^{n_h} \sum_{L=1}^{\Lambda} \sum_{j=0}^J I_{hi}^{Lj} y_{hi}^{Lj} + y_{0h} \right] \quad (1)$$

where	i	= household member
	L	= level of education
	Λ	= maximum level of education
	j	= labor status
	J	= economic sector
	I_{hi}^{Lj}	is an indicator function of labor status j of individual i with level of education L
	y_{hi}^{Lj}	= earnings of individual i with level of education L in economic sector j
	y_{0h}	= total non-labor income received by household h

The total household income—the expression in brackets in equation (1)—results from adding two main sources of family income: *labor* and *non-labor* income. At the same time, the total family labor income is the aggregation of earnings in different economic sectors across members.¹¹ So, we see not only whether an individual participates (or does not participate) in the sector, but also whether that individual receives (or does not receive) wages for that job. The labor participation model relies on the utility maximization approach developed by McFadden.¹² Assume that the utility (U_{hi}^{Lj}), for individual i of household h , associated with labor status $j=0, \dots, J$, and level of education L , can be expressed as a linear function of observed individual and household characteristics (Z_{hi}^L) and unobserved utility determinants of the

¹⁰ This section is based on Olivieri, S. et.al (2014)

¹¹ Notice that although we could estimate specific models for salaried and non-salaried workers based on the microdata from the household survey, we would not be able to use these models because this information, generally, is not available from the macro side. Macro-economic projections are calculated mainly for aggregate economic sectors such as agriculture, industry and services instead of wage or self-employed, formal and informal sectors.

¹² McFadden (1974).

occupational status (v_i^{Lj}). Furthermore, individual i chooses sector j (the indicator function $I_{hi}^{Lj} = 1$) if economic sector j provides the highest level of utility:¹³

$$U_{hi}^{Lj} = Z_{hi}^L \Psi^{Lj} + v_i^{Lj} \quad (2)$$

$$I_{hi}^{Lj} = 1 \text{ if } U_{hi}^{Lj} \geq U_{hi}^{Ll} \quad (3)$$

with $j = 0, \dots, J$ and $L = \text{education level}$
for all $l = 0, \dots, J, \forall l \neq j$

Each individual must choose from six alternatives: being inactive, unemployed, or being in an economic sector (i.e., agriculture, mining, manufacture and construction and services). The criterion value associated with being inactive is arbitrarily set to zero. The unobserved utility determinants of each occupation status are assumed to be identically and independently distributed across individuals, occupations and skill levels. In this case skill levels are defined as mutually exclusive categories: low skilled individuals are defined as those individuals with less than higher secondary education while high skilled individuals are defined as individuals with complete higher secondary or more.

The observed heterogeneity in earnings in each economic sector j can be modeled by a log-linear function of observed individual and household characteristics (X_{hi}^L) and unobserved factors (μ_{hi}^{Lj}) as a standard Mincer equation.¹⁴ These earnings functions are defined independently of each economic sector by skill level (L):

$$\log y_{hi}^{Lj} = X_{hi}^L \Omega^{Lj} + \mu_{hi}^{Lj} \text{ for } i = 1, \dots, n_h \text{ and } j = 1, \dots, J \quad (4)$$

The second component of the total household income, total family *non-labor* income, is the sum of different elements at the household level such as international (r_h^I) and domestic remittances (r_h^D), capital, interest and dividends (k_h), social transfers (tr_h), and other non-labor incomes (z_h). Formally,

$$y_{0h} = r_h^I + r_h^D + k_h + tr_h + z_h \quad (5)$$

We focus only on international remittances and make some minimal assumptions about other components. Ideally, we would model international remittances, but migration-related information in most surveys is poor or insufficient. Therefore, we rely on a simple non-parametric assignment rule that is consistent with the existing evidence.

Equations (1) to (5) complete the model. Total household income is a nonlinear function of the observed characteristics of the household and its members, and unobserved characteristics of household members. This function depends on a set of parameters: those of the occupational choice model for each skill level and the parameters in the earning functions for each economic sector and skill level. We assume

¹³Bourguignon and Ferreira (2005) say that this interpretation is not fully justified because occupational choices may actually be constrained by the demand side of the market, as in the case of selective rationing, rather than individual preferences.

¹⁴Mincer (1974).

that there is no variation in the composition of the household. In other words, the number, age and gender of members of a household remain constant over time. The demographic change is incorporated via calibration of the survey weights. For further details on estimation strategy of parameters see Olivieri, S. et al (2014).

Simulation

The second step consists of *replicating* macroeconomic simulated changes (i.e., sector of employment, total output or public and private transfers) between the baseline of 2012 and each projected scenario for 2014 of changes in different components of the household income generation model (i.e., labor and non-labor income). This process is divided into three sub-steps ordered in the following sequence: population growth, labor market status and income, and non-labor income.

The population growth adjustment is particularly important in countries with high fertility rates, important immigration flows, or when the last available household survey is relatively far from the projection year. In the first case, the number of labor market entrants rises faster than overall population. In practical terms, this allows us to explicitly take into account changes in the size of the working age population, and hence to distinguish between employment growth driven (or rather absorbed) by demographic trends and net (or additional) employment growth.

In the case of Iraq, we divide this adjustment into two steps: natural population growth between baseline (2012) and projected year (2014); and then internal displacement of 2014 population. The first step is done by re-weighting households in the baseline data (i.e. IHSES 2012) to replicate demographic changes predicted by gender, age groups and governorates. In most household surveys, the household is the unit that is sampled, thus the probability of including an individual conditional on the household being selected is 1.¹⁵ In other words, the survey weights attached to every individual within the household should be equal. In this sense we can write the initial or prior weights as:

$$\sum_h \sum_i w_{hi} = N \quad (6)$$

where N is the initial total population

$$w_{hi} = w_{hj} = w_h \quad \text{for } i \neq j \wedge i, j \in h$$

where w_{hi} is the weight of individual i within household h , equal to the common weight w_h . So, we can rewrite (6) as:

$$\sum_h w_h \text{ household size} = \sum_h w_h^* = N \quad (7)$$

This can be written in terms of probabilities:

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¹⁵ This section is based on Wittenberg (2010).

$$1 = \sum_h \frac{w_h^*}{N} = \sum_h q_h^* \quad (8)$$

Given a new structure and/or total population that we would like to estimate:

$$\begin{aligned} \sum_h \sum_i \tilde{w}_{hi} 1 [\text{age group, gender, governorate}] \\ = \tilde{N} [\text{age group, gender, governorate}] \end{aligned} \quad (9)$$

$$\sum_h \sum_i \tilde{w}_{hi} = \tilde{N} \quad (10)$$

where $1 [\text{age group, gender, governorate}]$ is the indicator function, $\tilde{N}$ is the new total population and each member i of household h has the same weight,

$$\begin{aligned} \tilde{w}_{hi} = \tilde{w}_{hj} = \tilde{w}_h \quad \text{for } i \neq j \wedge i, j \in h \text{ then} \\ \sum_h \tilde{w}_h \text{ household size} = \sum_h \hat{w}_h = \tilde{N} \end{aligned} \quad (11)$$

In probability terms:

$$1 = \sum_h \frac{\hat{w}_h}{\tilde{N}} = \sum_h r_h^* \quad (12)$$

The idea is to go from the initial weight (w_h^*) or probability (q_h^*) distribution to a new one ($\hat{w}_h$ or r_h^*) imposing several constraints such as gender, age group or governorate growth population rates. Formally, the new probability distribution can be obtained by solving the following optimization problem:

$$\min I(r, q) = \sum_h r_h^* \ln \left(\frac{r_h^*}{q_h^*} \right) \quad (13)$$

such that

$$\begin{aligned} E(x_j) &= \sum_h r_h^* m_{x_j h} \quad j = 1, \dots, J \\ \sum_h r_h^* &= 1 \end{aligned} \quad (14)$$

The term $m_{x_j h}$ is the mean of the x_j characteristic within the household h ($m_{x_j h} = \frac{\sum_i x_{jih}}{hhsiz_e h}$). In other words, this optimization procedure asserts that we should pick the distribution r_h^* that meets the moment constraints and the normalization restriction while requiring the least additional information,

and we should pick the one that deviates as little as possible from the initial distribution (q_h^*). The solution to this problem is given by:

$$\hat{r}_h = q_h^* \frac{\exp(X\hat{\lambda})}{\Omega(\hat{\lambda})} \rightarrow \sum_h \hat{w}_h = \sum_h w_h^* \theta_h = \tilde{N} \text{ with } \theta_h = \frac{\exp(X\tilde{\lambda})}{\Omega(\tilde{\lambda})} \quad (15)$$

where $\hat{\lambda}$ is the Lagrange multiplier for the constraint $E(X)$, and Ω is the normalizing factor to scale the new population to the target size. In the simulation process we impose several population constraints which result from different growth rates by gender age group and governorate brackets.

The internally displaced population movement is taken into account after the above mentioned adjustment in weights has made. The input for this step is an out-in flow matrix from the International Organization of Migration (IOM) which estimates the total number of families who had crossed governorate borders between June and December 2014. The lack of information about the characteristics of this population implied the following procedure: first randomly selecting families from governorates of origin like Anbar, Nineveh or Salahadin, and then allocating them to host governorates for instance, Dohuk, Erbil or Baghdad. It is relevant to note in this case that families and households are considered equivalent and all members of households classified as IDP are moved.

The rest of this simulation process follows Olivieri, S, et al. (2014).¹⁶ Briefly, it uses predictions of behavioral models estimated on the baseline household data (as in step 1 above), and generates household and individual-level predictions for employment, earnings and public and private transfers for 2014. Since an individual's labor income depends on his/her employment status and labor earnings, how the output change in a particular sector is apportioned between employment change, earnings change and adjustments across sectors depends on how responsive (elastic) employment in that sector is to output change. It also implies that at the household level, the extent of the impact depends on the size of the aggregate change at the sector level and the demographics and characteristics of household members, which influence the labor force status and earnings of household members after the change.

To simulate changes in *non-labor* income, projections of changes in public transfers are assumed to grow at different rates accordingly to the simulated scenario, while private transfers are assumed to grow at the rate of aggregate GDP for the relevant period.

Assessment

The final step is the process by which the information on individual employment status and labor income, as well as on non-labor income at the household level, is used to generate income or consumption distributions and calculate various poverty and distributional measures that can then be used to compare different scenarios. There are two steps needed to obtain the final simulated distribution.

The first step consists in using price projections to adjust the poverty line to reflect the difference in food and non-food inflation rates between baseline and projected year. Since the poverty line is typically

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¹⁶ For further details about how the labor and non-labor income components has been simulated see Olivieri, S, et al. (2014).

anchored to a food basket that ensures a minimum calorie intake, in case where food inflation is expected to be significantly different from general inflation between baseline and projected year, the baseline poverty line would not be enough for a household to meet the basic food requirements in the projected year.

In the case of Iraq poverty is defined in terms of consumption so the last step consists in transforming household incomes into predicted consumption levels by using the consumption income ratio for each household from the baseline year.

Limitations and assumptions

There are several limitations and assumptions to apply this method which are important to mention. Firstly, the quality of model projections depends on the nature and accuracy of the data underpinning the exercise. The results would depend not only on the validity of the micro-models but also on the macro projections. In addition, the use of the last available household data (IHSES 2012) as a comparator is tricky because the comparison could potentially attribute certain outcomes to that particular projection when they are a result of other factors that occurred over the period.

Secondly, the simulation relies on behavioral models built on past data that reflect the pre-existing structure of the labor market, household incomes and their relationships with demographics as they stood before the expected change. Consequently, the simulation assumes these structural relationships remain constant over the period for which projections are made. The more distant in the past the baseline year is, the more questionable this assumption is likely to be.

The model is limited in its ability to account for shifts in relative prices between different sectors of the economy as a result of the shock. While the poverty impact of shifts in the price of food relative to other prices is taken into account, other potential sources of price impacts are ignored – for example, the general equilibrium effect of a change in the terms of trade between agriculture and other sectors. In the absence of a CGE model, it is nearly impossible to explicitly model for changes in terms of trade between sectors.

The model works in the income space to account for different transmission channels through which households are affected. But to provide poverty projections for Iraq household incomes must be converted into consumption, using the assumption that the household's ratio between consumption and income is constant over time. This questionable assumption has at least the advantage of being simple and transparent. It is important to note that this assumption is partially relaxed for the case of IDP families as well as those living in governorates affected by the IS.

The model does not allow for geographic mobility of factors (labor or capital) across time. Thus, all individuals are assumed to remain in their 2012 place of origin, even as they experience a change in labor force status or sector of employment. While this assumption is an abstraction from truth, it is likely to matter only when the results are disaggregated spatially or across rural and urban areas. This assumption is relaxed in the case of families who were forced to migrate to a different governorate as a consequence of the war against the Islamic State.

Finally, there is the concern related to validation of the hypothesis, which applies to all ex-ante approaches including this. The only validation or test for this model is to combine ex-ante and ex-post analysis (see Bourguignon and Ferreira, 2003), some of which may be possible using newly available sources of data.

II. Scenarios and Macroeconomic inputs

The impact of the twin crises on poverty indices as well as any other distributional measure such as average consumption or income will be estimated in a “with-without” comparison framework. That is, the difference between “with-shock” and “without-shock” scenarios for the same projected year. In the Iraq case, this will correspond to the year 2014. The without-shock scenario is called business as usual (BaU). This is the scenario in which both population and economy behave as in their usual trend. In other words, economic agents will behave accordingly to what has happened in the past, which in this case is the trend between 2012 and 2013. On the other hand, the “with-shock” scenario is when both events: internal displacement and collapse of oil prices and the IS-related macro shocks, hit the economy during the second half of 2014. Thus, the impact is defined as the gap between these two scenarios for 2014.

The macroeconomic variables used as inputs into the micro-simulation are intended to capture most of the transmission channels discussed above. These variables are: i) changes in aggregate GDP and by economic sector; ii) changes in labor force participation rates and total and sectoral employment levels, iii) changes in public and private transfers; iv) population growth; and v) changes in price of food relative to non-food. All these macroeconomic inputs are generated in 2014 for both scenarios: business as usual (BaU) and crisis. Additionally, we include in the crisis scenario a series of assumptions for IDP and IS-affected areas related to assets, services from dwelling as well as employment and labor and non-labor income.

Changes in aggregate and economic sectors GDP¹⁷

The aggregate macro-economic and sector-specific growth rates for Iraq are shown in Table 1. The BaU estimates assume the same pattern and trend of sectoral and overall growth in the 2013 to 2014 period as was measured in the 2012 to 2013 period. The estimates for the 2014 crisis year are from the official estimates produced by the Iraqi Central Statistics Organization. The latter estimates imply a negative 6 percent growth rate of GDP for Iraq for 2014, which incorporates the macroeconomic shocks related to war against IS and the oil price decline. Relative to a BaU scenario, where GDP would have grown at a positive rate of 9 percent, the magnitude of the macro shocks on GDP imply a 15 percentage point reduction in total economic activity.

The biggest sectoral contraction is in manufacturing and construction, primarily due to a fall in construction, which employs almost 14% of all Iraqi workers and where most of the poor are employed.

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¹⁷ Macroeconomic data and projections were provided by CSO – GoI (March 2014).

In 2014, under the crisis scenario, this combined sector would have experienced a reduction in growth by almost 4.5 percentage points, from a 27% expansion in a BaU scenario to a contraction of almost 18%.

The spillover effect from the decline in manufacturing and construction is likely to have an impact on other sectors as well, especially services which employs more than 65% of all Iraqi workers. Output growth in the services sector is projected to decline due to the crises by around 2.2 percentage points, from an increase of 11% in BaU to an 11% reduction.

Smaller impacts are expected in the other two sectors - mining and quarrying and agriculture - as well due to the spillover effect from other sectors and reduced oil prices. While mining and quarrying output is expected to reduce by more than 2 percentage points in 2014 due to crisis, the agricultural sector would be affected by a contraction of almost 1.5 percentage points in its growth rate. It is important to note that these sectors are expected to register a minor positive growth. The "loss" in growth is in comparison to the scenario of business as usual rather than indicating an absolute fall in output.

Changes in public and private transfers

Non-labor income components are grouped into two categories: public and private transfers. The first component includes transfers received by households from ration (i.e. Public Distribution System), pensions, social protection and other public transfers in cash and in kind. These are expected to increase at almost 14% in business as usual scenario (Table 1). This growth rate is identical as the real growth rate of the total amount of Pensions and PDS during 2013. In the crisis scenario, it is assumed there is zero growth for these types of transfers, reflected in a significant decline relative to the BaU scenario.

Private transfers include all other non-labor income components such as domestic and international remittances, capital and other private transfers in kind and cash. It is assumed that the growth rate of these components of the total household income will be the same as the annual growth rate as the total economy. Table 1 shows that these will grow at almost 9 percent in BaU and they will decrease at 6.4 percent in crisis scenario.

Translating changes in GDP into changes in employment

In order to assess how households adjust and adapt to macroeconomic changes in the labor market, the output growth estimates have to be translated into employment changes at the aggregate and sectoral level. In absence of a CGE or macroeconomic model which predict these labor market structures, we assume that changes in labor market conditions are proportional to changes in outputs, based on the estimated past relationship between output and employment. In other words, this requires estimating sectoral and total output-employment elasticities, which can then be applied to the output growth projections to generate changes in employment by sector and aggregate for both scenarios in 2014.

This implicitly assumes stable relationships between outputs, demand for labor, and labor earnings, which may not hold due to existing distortions in the labor market (such as segmentation and downward stickiness of nominal wages) and are likely to affect adjustments over time.

We estimate one set of elasticities for 2014 using information on sectoral GDP and employment changes between 2007 and 2012 (Table 2). Over the last 5 years, these parameters show a weak or inelastic response of employment to changes in output. For instance, manufacturing and construction grew at a high annual growth rate of 13 percent between 2007 and 2012, however, employment grew by only 4 percent annually. In the case of services, which employ more than 65% of total Iraqi workers, employment has been increasing annually at 2.4% in 2007-12; less than half of the rate of growth of output in the services sector in the same period.

Population growth

The simulation takes into account population growth and is particularly relevant in the Iraq case. The total population is projected to grow by 2.6% annually between 2012 and 2014, with the size of the working age population (from 15 -64 years old) growing by around 3.1% annually. We use official population projections by gender age groups and governorates provided by CSO. This adjustment is necessary to fully account for demographic changes that would affect the size and composition of the labor force and ultimately impact our estimates of the welfare measure (i.e. consumption or income per capita).

Changes in prices: Inflation

All household and individual incomes from labor and non-labor sources are expressed in real terms of the baseline year (constant in 2012 prices). Macroeconomic changes replicated on the micro data are also in real terms. This implies that in order to obtain projected poverty measures for 2014, the simulated household consumption will need to be compared against the poverty line of 2012.

In principle, there would be no need to adjust for prices given that all micro and macro components of the simulation are expressed in real terms. However, if food prices were to rise at a significantly different rate from the non-food prices, the food basket to which the poverty line is anchored would become unattainable at an income equal to the poverty line.¹⁸ Table 3 shows food CPI in Iraq is expected to increase at a higher rate than non-food and general CPI between the business as usual and crisis scenarios. Thus, it is relevant to assess the sensitivity of the simulation results once the impact of higher relative food prices on poverty line is taken into account.

To do this we correct for differential inflation of food and non-food items, by deflating the 2012 poverty line by the projected food and non-food CPI, using the food and non-food shares of the poverty line as weights. This method yields new poverty lines, which are then normalized to 2012 prices using the appropriate general CPI. For instance, the poverty line for 2012 after this adjustment is less than 1% higher than the poverty line in 2012 (Table 4). In the Iraq case these adjustments are almost negligible but these are implemented for consistency. Note that the CPI in the crisis scenario is actual data.

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¹⁸ To see how this can happen, note that the weight of food in the CPI is different from that in the poverty line. This implies that adjusting the poverty line by CPI would result in the same food basket (or calorie level) not being affordable if food price inflation were higher than that of general inflation, and conversely if food inflation were lower.

The adjusted poverty line for each scenario reflects the income levels required for an individual to be able to afford the same food basket despite the disproportionate rise in food prices. The simulated household consumption for the projected year are then compared to the new poverty line to compute poverty measures that take into account the impact of the higher relative price of food.

IDP and IS-affected populations

As mentioned previously, the twin crises are likely to have impacted households across Iraq through different transmission channels. For instance, households directly affected by the war against the Islamic State— which include the displaced, and those still living in the IS-affected governorates – will be affected differently, as will households belonging to communities hosting IDPs. In order to include the effect of these shocks in the simulation, additional assumptions are needed in the crisis scenario for 2014.

We first identify two types of populations of interest: a) Internally Displaced Persons (IDP) and b) those left-behind. The first group is based on information from the IOM Displacement Tracking Matrix (IOM DTM) of families crossing governorate boundaries by origin and source governorate. This is summarized in (Table 6). In the micro-simulation exercise, we focus on internal displacement from three governorates, which accounts for 90 percent of the total cross-governorate displacement. Based on the population flows measured in the IOM DTM, a subset of families is randomly selected from three governorates of origin (IS-affected governorates) - Anbar, Nineveh, and Kirkuk - and allocated in different host governorates in proportion to the movements measured in the IOM DTM. The second group consists of those who continue to live in the three governorates directly affected by IS – Anbar, Nineveh, and Kirkuk.

First, we describe the assumptions made about the income and consumption flows of the IDPs. The consumption of IDPs could have been reduced by a decrease in the quality or flow of services received from housing as well as the loss of immobile durable goods and assets. After discussions and agreement with counterparts from the Government of Iraq, we assume a 50% decrease in services received from the new shelter/dwelling and we eliminate all consumption from non-mobile assets like fridge, cooler, electric generator, etc. Both adjustments are household specific.

From the income viewpoint, additional assumptions are made. First, those previously employed in the private sector are assumed unemployed and consequently without any labor income. In contrast, IDPs who held public sector jobs have in general continued to receive their salaries and benefits. Secondly, private transfers are eliminated based on disruption of connection and communications between IDP and relatives as well as larger social networks. On the other hand, public transfers are untouched based on the assumption that IDP families can pick up their rations in new locations as well as still receive their pensions. Given that most IDP are now living in rented dwellings or camps, the flow of services from owned dwellings service is eliminated from the total household income for those who were owners in their governorate of origin.

For families left behind and still living in the IS- affected governorates of Anbar, Nineveh, and Salahadin, additional assumptions were made. In the income space, it is assumed that employment rates remain

the same but earnings are reduced by 60 percent as consequence of “taxation” by the Islamic State and a contraction in economic activity.¹⁹ Private and public transfers from PDS and social protection are eliminated based on lack of connection and communication with the rest of Iraq. However, left behind families are assumed to keep their pensions as well as their services received from dwellings when owners.

In the consumption space, it is reasonable to assume that there is negligible consumption on PDS food items as supplies have been cut off or are erratically available. The response in consumption of these items is very inelastic to changes in prices and people might consume them even in distorted markets (Krishnan, et al (2014)). However, these items are normal goods, which implies that consumption positively reacts to income changes. Given the combined effect of the likely increase in local prices as consequence of distorted markets and the reduction in total household income; the assumption of cutting off the consumption of food rations appears reasonable.

It is relevant to add that some of these adjustments are individual specific and others are household specific. While on the flow of services from durable goods and assets as well as public and private transfer adjustments act at the household level, labor status and labor income adjustments work at the individual level. All these adjustments are implemented in the simulation sequence after total population growth has been factored in. The implication of this sequencing is that all labor and non-labor adjustments will take into account the implications of population displacement. For instance, the labor market in the Kurdistan region of Iraq will be affected by the addition of the IDP population. Finally, sensitivity analysis has been implemented with some of these assumptions and results were not affected significantly by them.

III. Results

This section presents the results of the first stage or prospective study of the economy based on the micro-simulation methodology described in Section 1. It is divided into three subsections: the first one shows aggregate results on employment, income, poverty and inequality impacts of the twin crises for total country and its component regions. The second part focuses on the distribution of such impacts across welfare groups. The third part presents results for the internal displaced population.

For this analysis, the 18 governorates of Iraq have been grouped into 6 regions. These are the following: Kurdistan (i.e. Erbil, Dohuk and Sulaimaniya); Baghdad; IS-affected (i.e. Nineveh, Anbar and Salahadin); Rest of North (i.e. Diyala and Kirkuk); Centre (i.e. Babylon, Wasit, Najaf and Karbala); and South (i.e. Basrah, Thi Qar, Qadisiya, Muthanna and Missan).²⁰

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¹⁹ Anecdotal evidence of taxation of salaries has been widely cited: <http://www.bloomberg.com/news/articles/2015-06-10/mafia-like-islamic-state-taxes-and-extorts-like-a-drug-cartel>; http://www.nytimes.com/interactive/2015/05/19/world/middleeast/isis-finances.html?_r=0

²⁰ This classification differs from that previously used in the World Bank (2015 a)

Aggregate effects

Labor market outputs and welfare levels

Table 5 presents information on projected changes in employment status: employed and non-employed. The latter is a combination of being inactive or being unemployed. The size of the labor force is predicted to grow as consequence of population growth in both scenarios. The additional 1.2 million potential workers would increase pressure into a non-dynamic labor market, particularly, in the crisis scenario where the economy would have diverged significantly from its natural path. This would represent an extra 800,000 non-employed Iraqi workers relative to BaU levels.

Employment shares by main economic sectors change between the two scenarios. There is a shift from the manufacturing and construction sector to agriculture and services sectors. This would represent a change from more productive/higher earnings jobs to less productive/lower earnings. However, these changes most likely cover fluctuations in the composition of sectoral employment not captured by the model such as changes in shares of formal and informal employment within a sector.²¹

The household income projections from the micro-simulation exercise are presented in Table 7. On average, labor income per capita represents more than 65% of total income per capita in the baseline 2012. Total household income per capita decreases almost 14% in crisis relative to business as usual as a consequence of a reduction in labor income of 20%, a much smaller fall in non-labor income and services from dwelling, almost 5 and 2 percentage points respectively. The reduction in non-labor income between scenarios would be the result from a reduction in both types of transfers: public and private (3 and 5 percentage respectively) for the country as a whole (Figure 3).²²

Similar patterns are observed across regions. However, the magnitude of these impacts are higher in IS-affected and Kurdistan regions than in other regions. For instance, total income would have cut almost by half in IS-affected areas and by 17% in Kurdistan both as a result of labor and non-labor income (Table 7). In the case of other regions (i.e. Baghdad, Rest of North, Centre and South) would have suffered a much less reduction in both labor and non-labor incomes (Figure 3).

The increase in unemployment rates combined with the reduction in labor as well as non-labor income are reflected in lower levels of per capita consumption. The simulation results show a 10% reduction in average consumption per capita for Iraq as a whole. This is 4 percentage points lower than the decrease estimated in total income (–14%) which seems reasonable given that households might smooth consumption during difficult events and over time.

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²¹ This is one of the limitations of this approach and it is based on the difficulty to obtain macroeconomic projections for formal and informal employment changes by economic sector. We are considering an extension to the model in future work given the importance of the issue from a distributional angle.

²² Public transfers include: PDS, pensions, social protection network compensation and other public transfers in cash and in kind. Private transfers include domestic and international remittances, capital and other private transfers in cash and in kind. The latter are assumed to move at the same growth rate as the total economy.

These results are not homogeneous across regions. Consumption per capita in IS-affected areas would have been reduced by 20% which is double the average national level impact. This region was followed by Kurdistan with a 14% decline, South (-11%), Centre (-9%), Rest of North (-9%) and Baghdad (-8%) (Table 7).

Poverty and inequality

Table 8 shows projected poverty measures for 2014 in both scenarios –i.e. business as usual and crisis- for the whole country and the regions. Poverty headcount rates are expected to increase by 7.5 percentage points between the business as usual and crisis scenarios. This represents roughly an additional 3 million individuals who are estimated to fall into poverty as a consequence of the twin crises. The magnitude of the impact is likely to have pushed Iraq back to poverty levels similar to those of 2007.

These twin crises have not only affected the welfare levels of the population in general, but also of those who would have been poor in the business as usual scenario. This is measured by an increase of almost 3 percentage points in the poverty gap as well as the 1.3 percentage point growth in severity for the country as a whole (Table 8).

Even though the negative impacts of these crises have affected all regions, the intensity was not the same across the country. While Kurdistan and IS-affected regions are estimated to have quadrupled and doubled their poverty incidence levels respectively, the Centre would have increased its poverty incidence by almost 6 percentage points followed by Rest of the North, South and Baghdad. The welfare levels of the poor have also deteriorated across all regions and similar patterns are observed for the gap and severity indices with the most severe effects in the IS-affected and Kurdistan regions. Interestingly, the poverty gap and severity would have increased more in the South than in Centre, Rest of North and Baghdad, likely reflecting the larger share of population living close to the poverty line there prior to 2014 (World Bank 2015). The adverse welfare impacts in Kurdistan and the IS-affected governorates are likely underestimates because they do not take into the likely increase in the prices of basic needs in the IS-affected governorates or the lack of payment of public sector salaries in Kurdistan during some months of 2014.

Aggregate inequality is expected to remain stable relative to the business as usual scenario for the whole population – with the Gini and Theil index increasing slightly almost 1 point between scenarios (Table 9). However, the average nation-wide impact hides differences across space. Three regions -i.e. Kurdistan, Baghdad and IS-affected- would have suffered an increase in their inequality levels as a consequence of the crises. Most of these movements are projected to be partially compensated by other regions producing a relatively stable inequality for the country.

Distributional effects

One of the advantages of using the micro-simulation approach is the possibility of fully taking into account the heterogeneity of individuals observed in the household survey. This allows us to identify with some precision who are likely to be the winners or losers of the shocks modeled. Indeed, as the results

show, there were no winners in Iraq. Particularly for Iraq, it allows us to examine the type of households that are likely to suffer from the twin crises, the primary channels of impact and their relative importance, and the distribution of the benefits or losses across different income groups.

We first examine the characteristics of the group we will call “new poor”, which refers to households who would have become poor in 2014 as consequence of the crises, and compare them with respect to the “always poor”, i.e., those who would remain poor in business as usual and crises scenario, and the non-poor or those who would not be poor in either scenario. Second, we use Impact Incidence Curves (IIC) to see how changes in consumption are distributed across consumption groups and regions. Third, we construct transition matrices to examine movements of households along the income distribution between scenarios –i.e. business as usual and crises.

A profile of the “new poor”

The impact on the “new poor” is four times deeper than that observed in the rest of the population in terms of both consumption and income per capita losses. Households identified as “new poor” are estimated to have suffered a more than 40% decrease in consumption per capita and almost 51% drop in per capita income as consequence of the crises. Higher changes in per capita income than in per capita consumption seem reasonable given that households might smooth consumption over time. These results are shown across regions with much higher impacts in those households living in governorates affected by IS and the Kurdistan region.

Almost all losses in per capita income of the “new poor” come from labor income. These households experience a roughly 60% fall in their per capita labor income (which represents 65% of total per capita income). However, per capita non-labor income also declines by 35% between business as usual and crises scenarios. These effects are more severe in the Kurdistan and IS-affected regions. While in KR-I, labor and rent contribute most to reduction in total income, in IS-affected governorates it is labor and non-labor incomes (as a consequence of reduction of private and public transfers) that drive the overall decrease in total incomes.

A few characteristics of the newly poor households appear to distinguish them from the always poor as well as the non-poor. The new poor are more likely to be in smaller households and with lower dependency rates than those always poor households. In terms of other characteristics as well, this group falls “in-between” the other two groups. New poor households heads are more likely to be low-skilled and below the age 46 than heads of non-poor households. On the other hand, they have “better” characteristics on average than the always poor – such as higher skills, along with smaller household size and lower dependency ratios, characteristics that would likely pull them out of poverty gradually when the economy recovers. These patterns are similar across regions.

Distribution of income losses

Next we examine how per capita household consumption losses are distributed across households. For this purpose we use the Impact Incidence Curves (IIC), which first order households according to their per

capita consumption levels (from lowest to highest), group them into consumption percentiles for the business as usual and crises scenarios; and plot the annual growth rate of per capita household consumption by percentile between scenarios. We perform this exercise for all households, as well as for specific groups. Each IIC allows us to compare percentage consumption gains or losses across households within the group. Comparisons across groups (e.g. households in KR-I and South regions) are not straightforward. For instance, given that on average consumption levels are higher in KR-I than in the South, a household in the 40th percentile of the KR-I consumption distribution is quite likely to significantly be better off than the 40th percentile household in the consumption distribution of the South.

The projected economic decline between business as usual and crises scenarios is expected to translate into lower consumption across the entire distribution and in all regions. This is shown by Figure 4 where Impact Incidence Curves are all below zero. In other words, across the distribution, and in each region, households are estimated to have experienced a negative welfare impact – there were no winners, as the entire distribution suffered welfare losses. However, the reduction would not have been proportionally distributed across deciles and this affects inequality as mentioned before. Per capita household consumption losses are largest among those households at the bottom of the distribution (10th to 40th percentile), with an average loss of almost 16% between business as usual and crises. Households at the very bottom -1st to 10th percentiles- have been less fortunate than the rest by suffering a 21.5% reduction in welfare.

Consumption losses are estimated to be higher in IS-affected governorates and KR-I than other regions across the entire distribution. For instance, the average impact on a household living in an IS-affected governorate would have been more than double that of the total country (-27 % vs. -13%) and in KR-I this would have been 5 percentage points higher -i.e. -18%.

Incidence of losses and income mobility

The IICs provide information about consumption gains or losses incurred by the average household within each percentile of the consumption distribution, and are thus useful in identifying which consumption groups experience relatively larger or smaller changes. However, they can hide a significant amount of heterogeneity in the absolute size of impacts, even among households with very similar baseline or initial per capita household consumption levels.

An alternative is to examine the size of the income change experienced by the households in each consumption group. We do this using matrices constructed by deciles of per capita consumption, keeping the upper and lower limits of each decile fixed at the business as usual consumption levels. In other words, we examine how many households within relative narrowly-defined groups (i.e. business as usual per capita household consumption deciles) experience a consumption gain or loss between business as usual and crises scenario in 2014 large enough to push them up or down by one consumption decile or more, where consumption deciles are defined on the basis of the business as usual distribution.

We perform the exercise separately for total and regional per capita household consumption. Figure 5 shows the share of households in each decile who: (i) suffer an income loss large enough to shift them to a lower consumption decile; (ii) experience a relatively small consumption movement and therefore their position remains unchanged; and (iii) experience a positive change and therefore are better off in crises.

Approximately 40% of all households remain in the same consumption decile for total Iraq. Given that the deciles are fixed at baseline consumption levels, most of the remaining households experience a movement down and are mostly concentrated in the lower-middle of the distribution, namely in 3rd-7th deciles.²³

Having said that, the country-level pattern is not representative of the heterogeneity of impacts across regions. Figure 5 shows while in Baghdad almost 60% of households remain in the same decile of per capita consumption, the opposite would have happened in Kurdistan. Most households would have been pushed to a lower level of welfare in IS-affected governorates independently of their initial position. In Rest of North and Centre more than 60% of households would have been affected enough to push them down in the ladder across the distribution. In contrast, household in the South 6 out of 10 households would remain in the same situation as in the business as usual.

Impacts on IDP

Since June 2014, Islamic State militants extended their influence from Syria into Iraq's northern and western provinces of Anbar, Nineveh, Salahadin, and to a lesser extent, Kirkuk and Diyala. As mentioned above, an estimated 354,000 families were internally displaced between June and December of 2014 which represents about 2.1 million individuals.²⁴

The bulk of the forced displacement of people took place in the five IS-affected governorates, with Anbar, Salahadin and Nineveh alone accounting for 90 percent of the displaced families (Figure 6). These internally displaced persons (IDPs) have sought refuge across Iraq – 63 percent of IDPs have crossed into other governorates, about half of them into the three governorates of Iraqi Kurdistan.

As expected, the welfare levels of this group –i.e. consumption per capita – has shrunk by more than double that for the population on average. Household consumption per capita would have decreased by almost 22% between scenarios. The impacts on total income per capita would have been more severe (i.e. -61.6%) under the assumption of smoothing consumption over difficult times. These were mainly driven by a massive reduction in labor income (i.e. -62.5%) as a consequence of job loss. Unemployment rate rises up to 27% among this population which is almost 3 times higher than the increase suffered by the whole population.

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²³A higher concentration of population in the center of the welfare/consumption distribution produces narrow consumption intervals for each decile. The narrower the decile consumption interval, the higher the likelihood of household to jump into a different decile position. Given the small positive impacts of non-labor income mentioned above, very few households in these deciles suffered income gains as a consequence of the crises that are large enough to push them to a higher decile. However, these movements are negligible relative to the other options.

²⁴Source: IOM-OIM DTM Data January to December 25, 2014.

The lack of employment with the massive reduction in labor income reinforced by the loss of assets and services of a proper dwelling implies a significant increase in the incidence of poverty among the IDPs. Simulation results show that the headcount rate would have grown by 15 percentage points from 23% up to 38% which is twice the impact for the population as whole (Figure 7). In other words, 4 out of 10 internal displaced individuals would have become poor as consequence of the crises. Additionally, the poverty gap and severity would also increase by 5 and 3 percentage points for this population.

Overall, IDPs alone account for half a million of the additional poor people as a consequence of the twin crises (Figure 8). This represents almost 20% of the increase in the total number of poor (i.e. 2.8 million poor). However, the IDP poverty incidence crisis varies significantly across regions. While in Kurdistan IDP would have been contributed to 62% of the growth in the number of poor, in the South this population only would contribute 2%.

Having said this, not all IDP would have become poor as consequence of the twin crises. Poor IDPs only comprise 6% of the total number of 8 million poor people in the crisis scenario and only a third of them would have experienced a worsening of their welfare status large enough to have fallen into poverty as consequence of the crises.

IV. Validation

An important limitation that applies to all ex-ante approaches is related to the validation of assumptions and hypothesis. The only test of the simulation model proposed in this paper is to combine ex-ante and ex-post analysis (see Bourguignon and Ferreira 2003). Fortunately, the Central Statistical Office (CSO) and Kurdistan Region Statistics Office (KRSO) have collected a continuous Income Household and Expenditure Survey (C-IHSES) during 2014.

The objective of this survey was to provide a more frequent estimate of poverty and welfare in Iraq in the years in between the full-blown IHSES surveys (2007, 2012, and planned 2017/18). It was designed to be representative at the governorate level, with the intention that each wave would be nationally representative, with an intended sample size of 13,834 households, drawn equally from each of the 18 governorates.

However, the fieldwork was affected by the security situation in some governorates as a consequence of the influence of the Islamic State (IS) into Iraq's northern and western provinces beginning June 2014. As a result, there are two groups of governorates in the final sample of the C-IHSES: those where data collection was successfully completed and those where it could not be completed. Moreover, due to the evolving security situation, even in the first group of governorates where the intended sample was visited, the distribution of visits to certain primary sampling units was delayed or preponed.

In the first group, 13 out of 18 governorates were continuously surveyed over the entire period and the regions covered are the following: Kurdistan (i.e Duhok, Sulaimaniya and Erbil); part of Centre (Diyala, Babylon, Kerbela, Wasit and Najaf) and South (i. e. Qadisiya, Muthanna, Thi-Qar, Maysan and Basrah).

Only five governorates belong to the second group: Mosul, Kirkuk, Anbar, Baghdad and Salahaddin. Beginning from June 2014, there is significant or complete non-response in Salahaddin, Kirkuk, Nineveh and Anbar. In the case of Baghdad, only 65 percent of the intended respondents completed the survey with the last quarter of the survey's year and the rural sample being severely affected. Additionally, the number of households interviewed varies within the same governorate per month in all governorates. Furthermore, the sample frame used by C-IHSES did not include households who were forcibly displaced across governorate boundaries during the second half of 2014.

Despite all these limitations, a few exercises are proposed as second best options to assess the micro-simulation results. In order to test the Business as Usual scenario, the comparison between the first half of IHSES 2012 and C-IHSES 2014 for the whole country seems a reasonable approximation of what would have happened if there were no crises. However, some additional constraints and challenges arise in both micro and macro inputs dimensions. From the micro standpoint, rural Baghdad was excluded from the analysis to address comparability issues between these surveys, sample weights were adjusted and poverty lines were re-estimated based on IHSES-2012.²⁵ From the macro perspective, macroeconomic inputs may vary differently between actual first-half growth rates and simulated year growth rates.

Aggregate results in BaU scenario

Table 10 reveals that micro-simulation results for changes in poverty were more conservative than what might have actually happened if there were no crises for the country as a whole. For instance, while the micro-simulation model predicted a reduction of almost 4 percentage points in the headcount between 2012 and 2014; the actual reduction in the incidence of poverty between the first half of 2012 and 2014 was about 2 percentage points higher. Inequality micro-simulation predictions were more aligned to what Iraq experienced between 2007 and 2012 rather than what has happened in the first half of 2012 and 2014. In other words, actual movements in inequality indicators such as Gini and Theil were in the opposite direction as predicted.

The simulation model performed much better when the incidence of poverty was predicted at the regional level. Two-thirds of the regional poverty headcount levels were not significantly different from actual levels in 2014 (i.e. Kurdistan, South, Rest of North and Centre) (Figure 9). Baghdad and IS-affected governorates' headcounts were overestimated by the micro-simulation method in the BaU scenario. The simulation also overestimated the poverty gap in most regions except for Rest of North and Centre whose point estimates are within the confidence interval of indices for the first half of 2014 (Figure 10).

Measuring the impact of the twin crises in host governorates

As mentioned above, the household survey was implemented only in 13 out of 18 governorates throughout the year. This allows us to measure the impact of the twin crisis by implementing a before and after approach on these geographical areas. This method measures the difference on welfare or any other outcome like poverty or inequality between the first and second half of 2014. However, it is possible

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²⁵ Further details on the methodology used see Krishnan, Olivieri and Germiniasi (2015)

that some systematic differences between these two periods of time not related to these shocks, such as changes in seasons or celebrations (i.e. Ramadan, Eid, etc.), bias the measures of the impact.

To tackle this difficulty, the strategy proposed is divided into two steps. The first step consists in identifying systematic differences between two periods of time (i.e. first and second half of calendar year) based on a “normal/regular” year. In case these exist, impacts between first and second half of a crises year will be adjusted accordingly, otherwise no systematic adjustment will be necessary to implement. The second step consists in measuring the impact of the twin crisis on “host” governorates. This implies calculating the difference between first and second half welfare measure and other outcomes in 2014 adjusted for BaU seasonal differences.

Table 11 reveal that there are no systematic season effect between welfare measures of the first and second half of 2012. This finding stands not only for familiar FGT poverty indices (i.e. incidence, gap and severity) but also across geographical areas from national estimates to regional ones. Note, the difference between poverty lines of first and second half of 2012 is not significant: less than 0.5% points. Consequently, these differences are also not affected by the choice of the poverty line. This also indicates that the crisis impact measures in 2014 do not need to be adjusted by systematic or seasonal differences.

The impact of the twin crisis on the incidence of poverty for “host” governorates across the country was an increase of 3 percentage points from 12.8 percent in the first half to almost 16 percent in the second half of 2014 (Table 12). This change was driven mainly by the significant deterioration in the welfare of households living in Kurdistan and the South. Both regions have suffered a similar rise of 4.5 percentage points in their headcount poverty rates. However, the worsening in living standards for the poor was significantly manifested only in Kurdistan. The poverty gap increases more than 1 percentage point in only half year (Table 12).

These findings are strongly correlated to two facts: how the crises spread over the country and where the most vulnerable population lives in Iraq. As above mentioned, the oil price crisis affects the whole country and it is not surprising seeing the deterioration in the South where most vulnerable and poor population lives. However, this region was relatively isolated from the war against IS. On the other hand, Kurdistan was the region which was affected by both. In particular, Kurdistan was the region which relatively hosted most IDPs in the second half of 2014.

These findings are aligned to the results found with the micro-simulation exercise. It is important to highlight the fact that these impacts exclude Internal Displaced People as a consequence of the survey design. Thus, regional and total impacts are expected to be higher when taking them into account. The micro-simulation predicted 5.5 percentage points increase in incidence of poverty in the South. This is 1 percentage point higher than micro data estimates. In Kurdistan, simulated results were 5 percentage points higher than what actual data revealed. However, this difference is not strictly comparable given the actual data only focused on “host” households’ welfare.

V. Concluding remarks

Even in 2012, before the current crisis, one-fifth of the Iraqi population lived below the national poverty line; and many more lived close to the line, vulnerable precisely to the sorts of welfare shocks they are facing today. The 2014 crisis has eroded the welfare gains of the past, with poverty falling back to 2007 levels and a 20% increase in the number of the poor. While the incidence of poverty is higher among IDPs than the rest of the population everywhere except in the IS-affected governorates, IDPs make up only a small proportion of Iraq's 8 million poor in 2014. The rest comprise of households who already lived below the poverty line, or those who have fallen below the poverty line in the face of the massive economic disruptions the country is facing. Finally, the welfare impact of the crises varies widely across space, with the largest increases in headcount rates in KR-I and the IS-affected governorates. Yet, the poorest regions in the 2014 crisis scenario are the same as in 2012 – the currently IS-affected, and the South, with poverty rates of 40 % and 30%, respectively.

Even though simulated results are not strictly comparable to ex-post micro data estimates because of survey coverage constraints; overall the results are very much in line, particularly in Kurdistan and the South. On the one hand, the micro-simulation estimates under-estimated the gains in poverty reduction that were actually achieved between the first half of 2012 and the first half of 2014 prior to the crisis. Indeed, microdata estimates suggest an increasing momentum in welfare gains had the crisis not hit, relative to the 2007-2012 period, from which the micro-simulation derives several parameters. On the other hand, the micro-data estimates do not include internally displaced persons, while the micro-simulation exercise incorporated the welfare and distributional impacts on this group as well.

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Figures

Figure 1: Crude oil prices, January 2012 – March 2015

Source: http://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm

Figure 2: Civilian casualties, January 2007 to September 2014

Source: Iraq Body Count, <http://www.iraqbodycount.org/database/download/ibc-incidents.php>

Figure 3: Changes in per capita income components -crisis vs. BaU

Source: Own estimations based on IHSES 2012

Figure 4: Impact incidence Curves by region

Source: Own estimations based on IHSES 2012

Figure 5: Transition matrices

Source: Own estimations based on IHSES 2012

Figure 6: Displacement from northern and western governorates of Iraq

Source: International Organization of Migration, Displacement Tracking Matrix, December 2014

Figure 7: Changes in Poverty for IDP (crisis vs. BaU)

Source: Own estimations based on IHSES 2012

Figure 8: Additional number of poor classified by displacement

Source: Own estimations based on IHSES 2012

Figure 9: Incidence of poverty at regional level – Micro-simulation vs. Actual data

Source: Own estimations based on IHSES 2012 and C-IHSES 2014

Figure 10: Poverty gap at regional level – Micro-simulation vs. Actual data

Source: Own estimations based on IHSES 2012 and C-IHSES 2014

Tables

Table 1: Real output annual growth rates – actual and projections

	2012	2014		Impact
		BaU	Crisis	
Total	12.6	8.8	-6.4	-15.2
Agriculture, Forestry, Hunting & Fishing	4.3	1.5	0.4	-1.2
Mining & Quarrying	12.8	3.2	0.8	-2.4
Manufacturing and Construction	26.6	27.0	-17.6	-44.6
Services	11.2	10.8	-11.0	-21.9
Public transfers: Pensions + PDS	17.8	13.9	0.0	-13.9
Private transfers	12.6	8.8	-6.4	-15.2

Source: Own estimations based on CSO

Table 2: Elasticity of employment to output by economic sector

Economic Activities	Employment					
	2007	Share %	2012	Share %	Annual growth rate	Output elasticity of labor
Agriculture, Forestry, Hunting & Fishing	852,521	12.6	667,285	8.9	-4.78	-1.78
Mining & Quarrying	81,568	1.2	76,441	1.0	-1.29	-0.17
Manufacturing and Construction	1,419,767	20.9	1,739,328	23.3	4.14	0.32
Services	4,425,311	65.3	4,982,893	66.7	2.40	0.38
Total by Activities	6,779,167	100.0	7,465,946	100.0	1.95	0.27

Source: Own estimations based on IHSES 2007 and 2012.

Table 3: Food and Non-Food Inflation

	2012	2014		Impact
		BaU	Crisis	
General	140.1	142.7	145.9	3.2
Food	147.4	148.0	152.2	4.2
Non-Food	137.0	140.5	143.2	2.7

Source: Own estimations based on CSO.

Table 4: Food – Non-Food Adjustment to Poverty Line

	Poverty Line	CPI
Food share	47.86	30.06
Non-Food share	52.14	69.94
Change in poverty line		
BaU	-0.35%	
Crisis	0.02%	

Source: Own estimations based on CSO.

Table 5: Employment projections
(Individuals from 15 to 64 years old)

	2007	2012	2014		Impact
			BaU	Crisis	
Employment Status (Millions)					
Inactive	10.2	11.5	11.9	12.7	0.8
Employed	6.8	7.5	8.2	7.4	-0.8
Sectoral Shares					
Agriculture	12.6	8.9	7.7	8.7	1.0
Mining and Quarrying	1.2	1.0	0.9	1.0	0.1
Manufacturing & Construction	20.9	23.3	25.3	23.7	-1.6
Services	65.3	66.7	66.0	66.6	0.6

Source: Own estimations based on IHSES 2007 & 2012.

Table 6: Internal Displaced Population flows – number of families crossing governorate boundaries

		FLOWS OUT							TOTAL	
		Anbar	Babylon	Baghdad	Diyala	Erbil	Kirkuk	Ninewa		Salah al-Din
FLOWS-IN	Anbar		15	541	22			422	1,267	2,267
	Babylon	510		113	37		3	4,291	156	5,110
	Baghdad	10,404	349		1,619		294	4,432	949	18,047
	Basrah	228	29	42	161		180	691	369	1,700
	Dahuk	354						79,278	183	79,815
	Diyala	120						2	91	213
	Erbil	7,191			25			12,643	8,014	27,873
	Kerbala	703	153	60	29		15	10,054	111	11,125
	Kirkuk	8,246	80	151	1,406			2,479	17,636	29,998
	Missan	41	5	33	27		165	781	118	1,170
	Najaf	159			11		73	13,325	21	13,589
	Ninewa	381							182	563
	Qadissiya	173	23	65	118		375	2,237	60	3,051
	Salah al-Din	544		12		15				571
	Sulaymaniyah	5,571	48	499	4,522			3,737	6,566	20,943
	Thi-Qar	150	23	63	16		218	1,026	77	1,573
	Wassit	112		7	98		262	4,281	47	4,807
TOTAL		34,887	725	1,586	8,091	15	1,585	139,679	35,847	222,415

Table 8: Poverty impacts country and regions – crisis vs business as usual

	Head Count				Poverty Gap				Severity			
	2012	2014		<i>Impact</i>	2012	2014		<i>Impact</i>	2012	2014		<i>Impact</i>
		BaU	Crisis			BaU	Crisis			BaU	Crisis	
Iraq	18.9	15.0	22.5	7.5	4.1	3.9	6.6	2.7	1.4	1.7	3.0	1.3
Kurdistan	3.5	3.5	12.5	9.0	0.6	0.6	3.7	3.1	0.2	0.2	1.7	1.5
Baghdad	12.0	8.5	12.8	4.4	2.0	2.3	3.4	1.0	0.5	1.2	1.6	0.3
IS-affected	25.7	20.5	41.2	20.6	5.6	5.3	14.2	8.9	1.8	2.2	7.3	5.0
Rest-North	14.9	12.1	17.7	5.6	2.8	2.9	4.4	1.6	0.8	1.2	1.8	0.6
Centre	15.8	12.7	18.6	5.8	3.1	2.9	4.6	1.7	1.0	1.1	1.8	0.7
South	33.6	26.1	31.5	5.5	8.6	6.8	8.9	2.1	3.2	2.7	3.7	1.0

Source: Own estimations based on IHSES 2012

Table 9: Inequality impacts country and regions – crisis vs. business as usual

	Gini				Theil			
	2012	2014		Impact	2012	2014		Impact
		BaU	Crisis			BaU	Crisis	
Iraq	0.30	0.32	0.33	0.01	0.15	0.19	0.20	0.01
Kurdistan	0.28	0.30	0.33	0.02	0.13	0.17	0.18	0.01
Baghdad	0.27	0.30	0.31	0.01	0.13	0.16	0.17	0.02
IS-affected	0.27	0.31	0.36	0.05	0.13	0.17	0.25	0.08
Rest-North	0.27	0.30	0.30	0.00	0.12	0.18	0.17	(0.01)
Centre	0.27	0.30	0.30	(0.00)	0.12	0.18	0.17	(0.01)
South	0.28	0.31	0.30	(0.01)	0.14	0.17	0.15	(0.02)

Source: Own estimations based on IHSES 2012

Table 10: Poverty and inequality changes – Micro-simulation and Actual data

	Micro-Simulation			First Half - IHSES		
	2012	2014	Change	2012	2014	Change
<i>Poverty</i>						
-Head count	18.9	15.0	-3.9	16.9	11.5	-5.4
-Gap	4.1	3.9	-0.2	2.2	1.2	-1.1
-Severity	1.4	1.7	0.3	0.6	0.3	-0.3
<i>Inequality</i>						
-Gini	30.0	33.0	3.0	29.9	29.0	-0.9
-Theil	15.0	19.0	4.0	15.5	14.8	-0.7

Source: Own estimations based on IHSES 2012 and C-IHSES 2014

Table 11: Poverty changes first and second half– 2012

		FIRST HALF					SECOND HALF					Diff
		Estimate	Std.	[95% Conf.Interval]		Deff	Estimate	Std.	[95% Conf.Interval]		Deff	
IRAQ	P0	18.94	0.01	17.43	20.46	2.44	19.69	0.01	18.33	21.05	2.12	0.75
	P1	4.26	0.00	3.86	4.65	2.00	4.72	0.00	4.31	5.14	2.19	0.46
	P2	1.47	0.00	1.29	1.64	1.85	1.66	0.00	1.46	1.85	2.25	0.19
Kurdistan	P0	2.89	0.00	2.13	3.66	0.89	3.58	0.01	2.55	4.61	1.37	0.69
Rest North	P0	15.92	0.02	11.71	20.12	1.76	22.92	0.02	18.59	27.24	1.48	7.00
Center	P0	14.87	0.01	12.25	17.49	2.50	14.19	0.01	11.89	16.49	2.29	-0.68
South	P0	33.69	0.02	30.62	36.75	2.61	33.52	0.01	30.78	36.26	2.35	-0.17
Kurdistan	P1	0.50	0.00	0.31	0.68	0.99	0.54	0.00	0.39	0.70	0.81	0.05
Rest North	P1	2.75	0.00	1.94	3.56	1.50	4.58	0.01	3.43	5.73	1.59	1.83
Center	P1	2.74	0.00	2.14	3.33	2.20	2.95	0.00	2.33	3.57	2.46	0.21
South	P1	8.31	0.00	7.42	9.19	2.09	8.77	0.00	7.86	9.67	2.31	0.46
Kurdistan	P2	0.15	0.00	0.07	0.23	1.08	0.13	0.00	0.09	0.18	0.46	-0.01
Rest North	P2	0.66	0.00	0.42	0.90	1.30	1.37	0.00	0.93	1.82	1.61	0.71
Center	P2	0.82	0.00	0.58	1.07	2.03	0.92	0.00	0.65	1.19	2.68	0.10
South	P2	3.03	0.00	2.63	3.44	1.91	3.24	0.00	2.80	3.68	2.31	0.21
Poverty line		73.73					73.43					-0.30

Source: Own estimations based on IHSES 2012

Table 12: Poverty impacts first and second half– 2014

		FIRST HALF					SECOND HALF					Diff
		Estimate	Std.	[95% Conf.Interval]		Deff	Estimate	Std.	[95% Conf.Interval]		Deff	
IRAQ	P0	12.88	0.01	11.41	14.34	1.81	15.78	0.01	14.37	17.19	1.54	2.90
	P1	2.45	0.00	2.06	2.84	2.14	2.66	0.00	2.36	2.97	1.52	0.21
	P2	0.75	0.00	0.58	0.91	2.36	0.70	0.00	0.59	0.80	1.42	-0.05
Kurdistan	P0	1.47	0.00	0.63	2.30	1.25	5.96	0.01	4.34	7.57	1.16	4.49
Rest North	P0	16.70	0.03	10.47	22.93	1.88	11.36	0.03	5.95	16.77	2.17	-5.34
Center	P0	10.73	0.01	8.19	13.26	1.77	10.72	0.01	8.49	12.94	1.55	-0.01
South	P0	21.89	0.01	18.96	24.81	1.79	26.41	0.01	23.69	29.13	1.54	4.52
Kurdistan	P1	0.30	0.00	0.11	0.49	1.00	1.45	0.00	0.95	1.94	1.20	1.15
Rest North	P1	2.88	0.01	1.19	4.58	2.49	1.89	0.01	0.79	2.99	2.31	-0.99
Center	P1	1.79	0.00	1.24	2.34	1.83	1.48	0.00	1.06	1.89	1.59	-0.31
South	P1	4.39	0.00	3.53	5.25	2.21	4.43	0.00	3.84	5.02	1.55	0.04
Kurdistan	P2	0.09	0.00	0.02	0.16	0.92	0.53	0.00	0.30	0.76	1.18	0.43
Rest North	P2	0.86	0.00	0.05	1.68	3.02	0.43	0.00	0.13	0.72	2.39	-0.43
Center	P2	0.47	0.00	0.28	0.66	1.72	0.35	0.00	0.21	0.49	1.62	-0.12
South	P2	1.39	0.00	1.02	1.77	2.44	1.10	0.00	0.90	1.30	1.49	-0.29

Source: Own estimations based on C-IHSES 2014

Annex

Table A.1: Multinomial – Low Skill Level

VARIABLES	Unemployed	Agriculture	Mining	Manuf. & Const.	Services
Age	0.110*** (0.0148)	0.161*** (0.0104)	0.143*** (0.0415)	0.199*** (0.00901)	0.260*** (0.00725)
Age squared	-0.00192*** (0.000208)	-0.00200*** (0.000132)	-0.00194*** (0.000487)	-0.00324*** (0.000117)	-0.00368*** (9.12e-05)
Urban	0.623*** (0.0666)	-2.400*** (0.0543)	0.363** (0.157)	0.337*** (0.0371)	0.477*** (0.0319)
ob.male#obn.hhead#ob.married	2.453 (1.968)	-0.166 (0.220)	11.75 (4462)	-1.159*** (0.398)	-1.138*** (0.197)
ob.male#obn.hhead#1.married	0.416 (1.972)	-0.673*** (0.214)	13.51 (4462)	-1.444*** (0.387)	-1.414*** (0.190)
ob.male#1.hhead#ob.married	2.165 (2.008)	-0.510* (0.266)	17.40 (4462)	0.760* (0.413)	0.414** (0.204)
1.male#obn.hhead#ob.married	0.982*** (0.120)	-0.493*** (0.0858)	-1.700*** (0.316)	-0.867*** (0.0652)	-1.035*** (0.0563)
1.male#obn.hhead#1.married	0.746*** (0.125)	0.307*** (0.0857)	-0.0410 (0.227)	0.0194 (0.0660)	0.0110 (0.0595)
1.male#1.hhead#ob.married	-1.452* (0.773)	-0.335 (0.293)	-3.434 (2.658)	-0.826*** (0.203)	-0.386** (0.158)
Received remittances	0.270*** (0.0581)	-0.0816* (0.0444)	-0.278 (0.174)	0.145*** (0.0347)	0.0639** (0.0292)
Dependency rate	0.105 (0.153)	0.747*** (0.109)	0.0429 (0.386)	-0.113 (0.0884)	0.0783 (0.0728)
Other member with public job	0.0272 (0.0568)	-0.711*** (0.0494)	0.202 (0.152)	-0.544*** (0.0374)	-0.208*** (0.0294)
Enrolled in school	-4.067*** (0.178)	-1.316*** (0.118)	-5.900*** (1.924)	-2.921*** (0.0804)	-2.665*** (0.0617)
ob.male#obn.ed_lvl	-5.870*** (1.979)	-1.723*** (0.238)	-21.23 (4462)	-5.001*** (0.399)	-4.537*** (0.199)
ob.male#1.ed_lvl	-6.057*** (1.989)	-1.942*** (0.246)	-35.06 (4573)	-4.962*** (0.413)	-4.857*** (0.212)
ob.male#2.ed_lvl	-5.645*** (1.976)	-1.842*** (0.242)	-19.96 (4462)	-4.529*** (0.392)	-4.508*** (0.200)
ob.male#3.ed_lvl	-4.106** (1.973)	-2.663*** (0.306)	-34.52 (4621)	-4.562*** (0.424)	-3.692*** (0.205)
ob.male#4.ed_lvl	-3.709* (1.978)	-2.699*** (0.368)	-17.83 (4462)	-3.258*** (0.412)	-2.461*** (0.203)
1.male#obn.ed_lvl	-0.239* (0.136)	0.412*** (0.117)	-1.394*** (0.275)	-0.109 (0.0739)	-0.738*** (0.0629)
1.male#1.ed_lvl	0.167 (0.136)	0.527*** (0.119)	-1.383*** (0.295)	0.202*** (0.0743)	-0.220*** (0.0632)
1.male#2.ed_lvl	0.171 (0.128)	0.326*** (0.114)	-0.388* (0.209)	0.102 (0.0692)	-0.168*** (0.0579)
1.male#3.ed_lvl	-0.259* (0.142)	-0.0384 (0.120)	-0.417* (0.249)	-0.00128 (0.0696)	-0.0666 (0.0563)
Constant	-4.430*** (0.343)	-2.247*** (0.242)	-4.983*** (0.955)	-1.500*** (0.201)	-1.791*** (0.165)
Observations	84298	84298	84298	84298	84298

Notes: Divisions are included - Source: Own estimations based on IHSES 2012

Table A.2: Multinomial – High Skill Level

VARIABLES	Unemployed	Agriculture	Mining	Manuf.&Const.	Services
age	0.151*** (0.0505)	0.422*** (0.0766)	0.752*** (0.0956)	0.562*** (0.0381)	0.537*** (0.0215)
Age squared	-0.00287*** (0.000712)	-0.00499*** (0.000929)	-0.00934*** (0.00121)	-0.00700*** (0.000473)	-0.00649*** (0.000265)
urban	0.130 (0.177)	-1.846*** (0.224)	0.321 (0.274)	0.268* (0.143)	0.155 (0.0993)
ob.male#obn.hhead#ob.married	-1.853** (0.913)	16.03 (11966)	15.94 (11186)	17.19 (10173)	-1.208* (0.722)
ob.male#obn.hhead#1.married	-3.143*** (0.910)	15.11 (11966)	14.16 (11186)	15.73 (10173)	-1.625** (0.718)
ob.male#1.hhead#ob.married	-19.18 (5077)	0.104 (14193)	1.192 (11942)	17.17 (10173)	0.411 (0.781)
1.male#obn.hhead#ob.married	0.934*** (0.292)	0.0947 (0.387)	-0.724 (0.444)	-0.254 (0.194)	-0.558*** (0.140)
1.male#obn.hhead#1.married	0.496 (0.327)	0.458 (0.336)	1.128*** (0.314)	0.287 (0.194)	0.0214 (0.160)
1.male#1.hhead#ob.married	-17.91 (8320)	1.383** (0.690)	-17.67 (7983)	0.982* (0.502)	-0.0405 (0.448)
Received remittances	0.135 (0.126)	0.165 (0.222)	-0.0425 (0.275)	-0.116 (0.114)	0.0940 (0.0716)
Dependency rate	0.0719 (0.321)	1.290** (0.571)	-0.873 (0.581)	0.451 (0.275)	-0.0992 (0.172)
Other member in public job	-0.246** (0.112)	-0.559** (0.219)	-0.0113 (0.217)	-0.147 (0.101)	-0.0637 (0.0636)
ob.male#5bn.ed_lvl	2.158** (0.931)	-18.30 (11966)	-33.73 (11241)	-20.17 (10173)	-0.780 (0.721)
ob.male#6.ed_lvl	2.102** (0.930)	-17.88 (11966)	-17.54 (11186)	-19.40 (10173)	-0.849 (0.723)
1.male#5bn.ed_lvl	-0.203 (0.182)	0.175 (0.233)	0.665*** (0.238)	0.379*** (0.130)	-0.0808 (0.107)
enrolled	-5.190*** (0.378)	-1.675*** (0.330)	-2.424*** (0.536)	-2.326*** (0.186)	-2.671*** (0.106)
2.division	0.279 (0.197)	-1.341*** (0.398)	15.58 (1396)	0.134 (0.173)	-1.115*** (0.0984)
3.division	0.289 (0.234)	-0.240 (0.352)	16.47 (1396)	-0.0341 (0.200)	-0.653*** (0.115)
4.division	0.737*** (0.198)	-0.475 (0.335)	15.42 (1396)	0.121 (0.181)	-0.619*** (0.101)
5.division	0.909*** (0.209)	-1.026** (0.411)	18.10 (1396)	0.181 (0.192)	-0.566*** (0.111)
Constant	-3.258*** (0.906)	-8.109*** (1.547)	-32.20 (1396)	-10.18*** (0.757)	-6.982*** (0.424)
Observations	10275	10275	10275	10275	10275

Source: Own estimations based on IHSES 2012

Table A.3: Earnings equations – Low Skill Level (log earnings)

VARIABLES	Agriculture	Mining	Manuf.& Const.	Services
age	0.0450*** (0.0116)	0.0386 (0.0284)	0.0286*** (0.00641)	0.0467*** (0.00523)
c.age#c.age	-0.000539*** (0.000148)	-0.000322 (0.000340)	-0.000339*** (8.72e-05)	-0.000574*** (6.66e-05)
urban	0.209** (0.0930)	0.117 (0.107)	-0.0266 (0.0194)	-0.0839*** (0.0173)
1.male	1.039** (0.439)	-0.488*** (0.158)	0.738*** (0.183)	0.263*** (0.0734)
1.hhead	0.188 (0.202)	0.222 (0.384)	0.0152 (0.271)	0.118 (0.0982)
1.male#1.hhead	-0.0435 (0.211)	-0.146 (0.392)	0.0699 (0.271)	-0.0358 (0.101)
ob.male#obn.ed_lvl	0.335 (0.430)	-1.447*** (0.399)	-0.362 (0.238)	-0.523*** (0.113)
ob.male#1.ed_lvl	0.545 (0.440)		-0.574* (0.322)	-0.655*** (0.154)
ob.male#2.ed_lvl	0.437 (0.436)	0.491 (0.394)	-0.289 (0.251)	-0.330*** (0.0965)
ob.male#3.ed_lvl	0.614 (0.485)		0.0964 (0.273)	-0.368*** (0.112)
1.male#obn.ed_lvl	0.143 (0.115)	-0.440*** (0.159)	0.0284 (0.0461)	-0.151*** (0.0343)
1.male#1.ed_lvl	0.130 (0.129)	0.0713 (0.176)	0.0338 (0.0476)	-0.111*** (0.0346)
1.male#2.ed_lvl	0.179 (0.114)	0.00519 (0.112)	0.0328 (0.0448)	-0.0324 (0.0308)
1.male#3.ed_lvl	0.109 (0.152)	-0.0199 (0.167)	0.00557 (0.0491)	-0.0407 (0.0360)
salaried	0.818*** (0.0710)		0.174*** (0.0660)	0.113*** (0.0278)
public_job	0.342*** (0.133)	0.265** (0.117)	0.0452 (0.0291)	0.360*** (0.0171)
2.division	0.448*** (0.127)	-0.277 (0.193)	-0.238*** (0.0423)	-0.240*** (0.0312)
3.division	0.910*** (0.0861)	0.342** (0.168)	-0.292*** (0.0486)	-0.185*** (0.0336)
4.division	0.402*** (0.0842)	-0.0692 (0.188)	-0.244*** (0.0370)	-0.258*** (0.0266)
5.division	-0.0205 (0.0953)	-0.127 (0.158)	-0.265*** (0.0405)	-0.244*** (0.0272)
Constant	2.318*** (0.463)	5.527*** (0.548)	4.685*** (0.223)	4.801*** (0.124)
Observations	5519	219	7556	17334
Adj R-squared	0.202	0.395	0.127	0.151

Note: Robust standard errors in parenthesis *** p<0.01, ** p<0.05, * p<0.1

Source: Own estimations based on IHSES 2012

Table A.4: Earnings equations – High Skill Level (log earnings)

VARIABLES	Agriculture	Mining	Manuf.& Const.	Services
age	0.183** (0.0847)	-0.0283 (0.0898)	0.0592* (0.0329)	0.0694*** (0.0123)
c.age#c.age	-0.00205* (0.00111)	0.000516 (0.00110)	-0.000650 (0.000395)	-0.000616*** (0.000149)
urban	0.126 (0.230)	-0.369 (0.261)	-0.202*** (0.0661)	-0.0347 (0.0243)
1.male	0.479 (0.427)	0.355 (0.328)	0.0306 (0.114)	0.169*** (0.0423)
1.hhead	-0.113 (0.242)	-0.311 (0.488)	-0.114 (0.155)	0.0697 (0.0610)
ob.male#5bn.ed_lvl	-0.550 (0.565)		0.260 (0.199)	-0.0627* (0.0336)
1.male#5bn.ed_lvl	-0.298 (0.236)	-0.159 (0.201)	-0.163** (0.0707)	-0.102*** (0.0332)
salaried	1.062*** (0.229)		0.315 (0.267)	0.107 (0.0876)
public_job	0.00797 (0.209)	1.126*** (0.390)	0.0589 (0.0729)	0.343*** (0.0482)
2.division	0.554 (0.437)	0.393 (0.576)	-0.186 (0.148)	-0.207*** (0.0484)
3.division	1.085*** (0.399)	0.739** (0.371)	-0.242 (0.219)	-0.206*** (0.0500)
4.division	0.816** (0.359)	0.449 (0.394)	-0.320** (0.138)	-0.177*** (0.0432)
5.division	0.546 (0.461)		-0.0888 (0.148)	-0.0777* (0.0406)
1.male#1.hhead			0.419** (0.173)	-0.0117 (0.0701)
Constant	0.138 (1.400)	5.495*** (1.626)	4.796*** (0.797)	4.182*** (0.291)
Observations	209	114	706	5359
Adj R-squared	0.268	0.0122	0.180	0.211

Note: Robust standard errors in parenthesis *** p<0.01, ** p<0.05, * p<0.1

Source: Own estimations based on IHSES 2012