

Technical Endnotes

- 1 The basis for the inequality of economic opportunity analysis is the Demographic and Health Survey (data collected from December 2003 to May 2004) which recorded data for 10,836 households, representative at the national level but also for five major regions (West, South, Central, North and East Regions). Information on basic socio-economic characteristics of the population was collected for all households' members and all ever-married women between 15 and 49 years old answered a detailed questionnaire on demography and health; in total, 8075 women provided information. This 'ever-married women's questionnaire' included information on the characteristics of these women at birth – place of birth (rural/urban; region), her father's and mother's education; maternal language, etc. Hence, the results presented in this Report are related to the wealth distribution at the household level with the circumstance variables being derived from the women in each household. For a more extensive discussion, see Ferreira et al. (2009).
 - 2 The inequality of opportunity share can be computed through a (i) parametric regression (which relates the wealth variable directly to the circumstance variable and uses the degree of explained variance as the, implicit, opportunity share; or (ii) non-parametric analysis that partitions the entire dataset in different, identical circumstance groups and calculates how much of the overall variance of household wealth is due to variation between the conditional cell means. The two techniques show similar results for Turkey. Important to note is that the inequality of opportunity share is a lower bound estimate of the inequality of opportunity share given that not all circumstance variables are captured in the household survey (e.g., parental occupation or parental wealth). See Ferreira et al (2009) for a detailed explanation.
 - 3 As explained in Ferreira et al. (2009), the parametric estimate provides a robust lower-bound estimate of the share of inequality of opportunity in total wealth disparity in Turkey. The decomposition of this share into the contribution each individual circumstance variable makes is, however, dependent on the partial correlation of the circumstances with omitted variables (i.e., the circumstances that were not included in the Turkish Demographic and Health Survey). See Ferreira et al. (2009) for a robustness test of the results with an alternative to the wealth indicator (imputed consumption at the household level).
 - 4 Using the exogenous circumstances, the entire population can be divided into different groups by their opportunity sets. E.g., one such group is made up of all households whose ever married women were born in the urban areas of the West region, to parents who both had higher education diplomas, whose mother tongue is Turkish and who had more than nine siblings. Ferreira et al (2009) distinguish 768 such different types. For each type, they calculate the mean wealth which they use to rank all types. The ten percent of the population with lowest wealth (conditional by type) are then termed the least advantaged decile; the ten percent with
- To assess the composition of the group of households that did not count an ever-married woman among its midst, we analyzed the Household Budget Survey for 2004 as this survey also includes information on employment and other variables of interest. The households which did not have an ever-married woman between 15 and 49 years old represented 17 percent of the total population (very close to the 20 percent obtained from the Demographic and Health Survey) but accounted for only 3 percent of all children below 15. A majority of the individuals living in households without an ever-married woman – 63 percent – represent households made up entirely of members that are 50 or more years old and not working. Reverting back to the Turkey Demographic and Health Survey, we find that the average size of households without an ever-married woman is 2.70, much lower than the mean size of the households in the TDHS sample (4.63 in 2004). Poverty is also less prevalent for the population living in those households with a rate of 19.8 percent, against 29.8 percent for the population in the TDHS sample households.

the highest wealth (conditional by type) the most advantaged decile. Examining the composition of these two groups produces an opportunity profile which is the basis for Graph 7 in the main text.

5 The adjustments and assumptions we have made in the simulations to assess the possible poverty impact of the economic slowdown are as follows:

- Our starting point is the 2006 Household Budget Survey for Turkey. Each household has a (spatially adjusted) real per capita consumption assigned with a (national) poverty line defined;
- To bring the 2006 data (the latest available survey) to 2008 as the base, we apply the real sectoral GDP per capita growth rates to the consumption per capita variable (distinguishing between the agricultural, industry and services/other sectors). The affiliation of each household to a sector is determined by the activity of the household head. For inactive or already unemployed household heads, we apply the average GDP per capita growth rate;
- We now map households into 6 different categories, based on the employment status of the household head: low-wage formal sector employment (those household heads with social security coverage and earning up to 1.5 times the minimum wage); high-wage formal sector (above 1.5 the minimum wage); informal sector working in agriculture; informal non-agricultural sector, unemployed; and inactive.
- We assess the potential impact of a growth slowdown of minus five percent real GDP growth in 2009 and minus one percent real GDP growth in 2010;
- The employment impact of the scenarios is determined by calculated average employment elasticities of output growth (Taymaz 2009). We assume the following: (i) the formal sector employment would contract with the historically calculated weighted elasticity of 0.47. In the growth scenario, this would lead to an estimated 170,000 heads of households losing their primary employment in 2009. We assume that these would be concentrated among ‘low-wage formal sector workers’ – Taymaz (2009) finds that during the last crisis in Turkey, by far the largest labor market adjustment occurred for these workers. Note that we assess only the labor market impact on household heads and not of the total labor

force; (ii) for the informal sector *outside* of agriculture, we assume the average historic output elasticity of 0.37, leading to a contraction of the sector affecting 45,000 heads of households until 2010. Similarly, in line with historic elasticity calculations, agricultural informal employment would not contract. Over the past ten years, agricultural employment has decreased strongly, independent of output decreases or increases (which leads to an actual calculation of an, insignificant, employment elasticity of 0.07). However, in times of crisis, such long-term declining trend could well be halted or, potentially, even be reversed as already seen in the latest aggregate employment figures of TUIK; (iii) we select the actual heads of households losing their employment in the two ‘contracting’ sectors (low-wage formal and informal non-agricultural sector) by random assignment; (iv) for all other sectors (high-wage formal employment, informal agriculture, inactivity, unemployment), we assume that the employment status of the households head does not change.

- To arrive at impacts on household welfare, we use the partial correlation coefficient (holding all other potential influencing variables constant) between consumption per capita and the household head being unemployed. The cross-section regression using the 2006 HBS data returns that, on average, an unemployed head of household is associated with an 18 percent lower consumption per capita level of the household. We apply this reduction to the population living in those households whose household head lost their employment in our simulation.

For the other sectors, we make the following assumptions: (i) for those households linked to the high-wage formal sector, we assume that they are relatively well able to protect their welfare level in real terms (in part because a good part of the workers would be unionized and/or in the public sector). We assume a reduction of half of the GDP per capita growth rate to apply to them; (ii) for households whose head is unemployed or inactive, we apply the full GDP per capita growth rate; (iv) the remaining households (those remaining in the informal non-agricultural sector after the above adjustments

are made) would then experience a decline in their consumption per capita level which ‘adjusts’ – the residual between the different assumptions for the other groups and overall GDP per capita growth.

Changes in consumption per household can then be analyzed by comparing the 2008 projected consumption level of the household with the simulated consumption per capita level in 2009 and 2010. We use this comparison to derive a profile of households that are at risk of falling into poverty as a consequence of the economic slowdown.

- 6 Definitions for variables (derived from Turkish Demographic and Health Survey) included in Table 4 are as follows: Antenatal care is defined as a pregnant woman receiving care provided by a doctor or a nurse/midwife through at least one visit. This share is calculated for all most recent births for ever-married women who had a live birth in the five years preceding the survey. Birth certificate: the child has an identity card as either; reported by the mother or verified by the enumerator. Attended birth: child’s birth given in a public or private sector health facility (the alternative being the respondent’s or someone else’s home). Complete immunization: immunization against six main vaccine-preventable illnesses: tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, and measles, through receipt of the following vaccinations before the first birthday: one dose of BCG, three doses of DPT and polio, and one dose of measles vaccine (BCG protects against tuberculosis, DTP against diphtheria, pertussis, and tetanus). Iodine deficiency: test of iodine content of the salt used for cooking indicates the salt is potassium iodized or contains potassium iodide (at least 15 parts per million); sample of children under five in a sample of households where the iodine content of cooking salt was tested. Stunting: standardized weight-for-age below 2 standard deviations of the mean of the reference population.
- 7 The source data and method for calculating approximate coverage rates for ECD programs in Turkey is as follows: Pregnancy monitoring, antenatal care and immunizations data are calculated from the Turkish Demographic and Health Survey (2004). Growth monitoring and psychosocial development

tracking data stem from the Ministry of Health Primary Health Care DG (Mental Health Unit) and refer to December 2008. Coverage of parent training programs originates from the Ministry of Education Apprenticeship and Non-formal Education DG and assumes that each parent reaches 2 children in the 0-6 age group, on average. Public and private preschool coverage rates for 4-6 year old group stem from MONE. Preprimary education coverage data for 2008-2009 academic year refer to the sum of public nursery classes and public kindergartens. Primary school enrollment rates are from MONE 2008-2009 primary school enrollment data. SHÇEK community centers coverage is calculated as 81 community centers each serving an estimated number of 500 children in the age group ($81 \times 500 = 40,500$ children).

- 8 The basis for the calculation of central public social expenditures by age group is the functional breakdown of expenditures published by the Ministry of Finance since 2006. We employed the following steps to assign 2008 expenditures by age group. First, we identified all centrally funded social expenditures that are not contribution financed. Hence, we only include treasury financed transfers to the social security institution that cover non-contributory programs (like the disability and old-age pension programs) or pension and health insurance deficits. Green-card expenditures are included in the Ministry of Health budget. As the only item outside the central public budget, we included in our analysis the funding for the conditional cash transfer program and other social safety programs of the SYGDM (which is financed through earmarked taxes not centrally collected through the Ministry of Finance). The state contribution to the Unemployment Insurance Fund is equally included in our analysis. Second, we used the guidelines and explanations published by the Ministry of Finance (Analitik Bütçe Sınıflandırmasına İlişkin Rehber) to identify the main beneficiary group of the relevant expenditures. Hence, except for general health expenditures, we derived the age-beneficiary relationship from the nature of the programs being financed as detailed further below. Third, to arrive at per capita spending levels, we divided total aggregate social expenditures by age group with the updated, age-specific population estimates provided by TUIK.

In the *health sector*, we used available age-specific beneficiary weights from the Ministry of Health to distribute aggregate health expenditures in Turkey (*Ministry of Health Turkey National Health Accounts Study 1999-2000, 2004*). We also apply these same weights to central government transfers to cover the deficit of the universal health insurance.

For *education*, we apply the following age-specific classification. All pre-primary education expenditures are used for age group 5 and 6; primary education expenditures are mostly used for age group 7-14, but a small fraction of primary education expenditures are counted under pre-primary expenditures because of the fact that currently around 600 thousand pre-school kids are provided services under the primary schools of MONE; all secondary education expenditures are used for age group 15-18 (items covered include General Programs of Secondary School; Technical Secondary School; and other 'Not Elsewhere Classified'). We also include the salaries of preschool teachers (full-time teachers) that teach at primary school facilities as benefits that accrue to the 5-6 year group. We take this amount (a total of around 400 million TL) from primary school budgets and add to the preprimary level. Then, we divide tertiary education expenditures into two age groups 19-25 and 25-35. Public spending on college; MYOs; and master studies are classified for the age group 19-25. Expenditures of the Government for doctoral programs are classified for the age group 26-35. The item "education not definable by level" consists of apprenticeship training; public training centers; and public vocational training. We distribute such expenditures by the approximate participant profiles of different training courses (from the Ministry of National Education). Lastly, "administrative and research activities" and "education services not elsewhere classified" are allocated among age groups according to the actual expenditure distribution excluding such item.

For the overall centrally funded *social protection* expenditures, we used the detailed description of the nature of the programs to distribute them across age groups. Sickness and disability transfers, which are provided by the SHÇEK, are distributed in relation to the population weights of the respective

age groups. "Old age services", which are also provided by the SHÇEK, include largely for those above the age of 65 to which group they were assigned. "Family and children benefit", which is mostly covered under the SHÇEK, are assigned to the age groups 0-6 years of age and 7-18 years of age based on the total number of SHÇEK beneficiaries in respective age groups. "Unemployment benefit" (representing the government contribution to the Unemployment Insurance Fund) spending is distributed according to the share of the active working age population weights of the respective age groups. Finally, "Social Inclusion program" spending covers the poor; immigrants; victims of crimes and violence; drug and alcohol addict. So, expenditures of the budget are distributed according to population weights of the respective age groups. *Social Protection Not Elsewhere Classified* item mainly covers transfers to SSI to cover the pension deficit; universal health insurance (UHI) deficit and non-contributory social assistance provided by SSI (including old-age pension; benefits for disabled; orphans; veterans etc.). This item also covers additional payments (*Ek Ödeme*) to all pensioners in order to cover tax refund and additional payments to high level civil servant retirees (like ex-mayors). The treasury transfer of the UHI is covered under the health expenditures of the government and it is distributed according to the distribution of the health expenditures defined above. The treasury transfer for pension spending is distributed, using population weights, for age groups above 65 and 44-64. Social assistance spending is distributed according to program types and number of beneficiaries. Additional payments to pensioners are distributed by using the weights of the respective ages. Lastly, spending outlays of the SYGDM for the conditional cash transfers to families is divided according to their different beneficiary groups: all pregnancy and health aids are assigned to the 0-6 age group; education support is allocated for primary school (7-14 age) and separately for secondary school (next age bracket using the respective population weights. Other spending outlays of the SYDGM are classified as (i) transfer to MONE for free books for primary school kids; free lunch provision and transportation support for disabled kids, (ii) educational assistance to poor

other than CCT, (iii) the other social assistance spending for poor. In kind transfers for primary school children is counted under social protection spending for age group 7-14 equivalent to the primary school age cohort Education spending other than the CCT is distributed to social protection expenditures for age groups from pre-primary to tertiary education according to their respective population weights. Other activities of the SYDGM with a poverty-focus are distributed to social protection expenditures according to population weights of the respective ages.

- 9 Distribution of pensions and other income transfers across household members: For this calculation, we use the Household Budget Survey (2006) dataset provided by TUIK. We consider transfers that are classified under pension benefits (variable name *emekli_yl* in HBS), social assistance transfers (*sosy_yl* in HBS) and non-contributory old age pensions (*yasli_yl* in HBS). In the first step, we sum all benefits received by members of the household at the household level. Secondly, we divide this total value of benefits by the number of people in each household and calculate the per capita benefits received in each household. Finally, we aggregate the benefits received by age level. Hence, we derive a distribution of benefits that accrue to each age category which we can then apply to aggregate expenditure data from the Ministry of Finance.
- 10 The micro-simulation is obtained using the methodology proposed by Bourguignon, Ferreira and Lustig (2005) and Bourguignon, Ferreira and Leite (2008). The micro-simulations rely on out-of-sample predictions based on the statistical relationships, observed in the 2006 Turkish household budget survey, between a set of observable characteristics and the determinants of income and poverty, including: attained levels of education, fertility choices, occupation, and labor earnings.

A model is estimated for each one of these outcomes and used for simulating the effects of an increase in educational attainments.

- The current relationship between a set of individual and family characteristics and educational attainment is estimated using an ordered probit model. This model is used for predicting the increases in educational attainments accruing to each individual under the examined educational expansion scenario.⁶⁷ Individual heterogeneity is taken into account⁶⁸ to incorporate the idea that, whatever the mean expansion at the national level, some individuals have unobserved characteristics that may or may not be favorable to the acquisition of education.⁶⁹
- The observed relationships between educational attainments, other individual and family characteristics and labor earnings are estimated using linear regression models. Labor earnings are estimated separately for formal wage earners and informal wage earners or independent workers. These estimates are used for predicting the increases in labor earnings in each occupation accruing to individuals who reach higher educational attainments. It is assumed here that the returns to education conditional on family and individual characteristics remain unchanged. This assumption rests on the non-endogeneity of attainments as regards the unobserved determinants of earnings, and in the absence of general equilibrium effects. Further simulations could explore alternative scenarios on the changes in the returns to education.
- Fertility choices, measured by the number of children per woman, are modeled using an ordered probit as a function of family and individual characteristics, including educational attainments. These estimates allow predicting the change, and likely reduction, in the number of children chosen by each woman after the increase of her educational attainment.
- Occupational choices, measured by a categorical variable indicating unemployment, formal wage employment and informal wage or independent employment, are modeled using a multinomial logit as a function of family and individual characteristics, including educational attainments but also the number of children. This model of

⁶⁷ This is done by translating the cut-off points of the ordered probit model, see Bourguignon, Ferreira and Leite (2008).

⁶⁸ Individual residuals are drawn from the distribution assumed by the model, which is a normal distribution in the case of the ordered probit.

⁶⁹ This heterogeneity is taken into account in the same way in the other equations of the model.

occupational choices can be viewed as a reduced form of a structural model of labor supply as potential earnings are not included among the independent variables. These estimates allow us to predict the direct effect of the increase of educational attainments but also its indirect effect through fertility changes.

The simulated changes in earnings, fertility and occupational choices, provide predictions of the effects of educational expansion on the structure of employment, and the distribution of earnings and family income, including poverty.⁷⁰ Per capita income depends on the occupations of each of the members of the household, the earnings they receive in those occupations, and family sizes (which depend on the number of children).⁷¹ Fertility changes thus have indirect effects on welfare through occupational choices and household size.

The simulated educational expansion we consider consists in an increase in the mean attainment of individuals aged 20 to 39 years old by one year⁷² (depending on characteristics, the educational attainment of each individual changes by a different amount). This age group is chosen in order to examine the long run effects of an educational expansion benefiting the cohorts born during the two coming decades. An average increase in attainments by one year corresponds to the estimated impacts of the past early child development programs in Turkey. However alternative scenarios of educational expansion can be explored.

- 11 We used a simple model of labor force participation and income earnings regressions to assess the possible consumption and poverty impacts of an increase in female labor force participation in Turkey.

Step 1: Using the Household Budget Survey for 2006, for all women 15 and above, we estimated a probit regression of labor force participation, controlling for all available individual (education, age, etc.) as well

as household characteristics (household size, marriage status, number of children, etc.).

Step 2: We used this regression to calculate the expected probability for each woman in the survey to be participating in the labor market (hence working or looking for a job).

Step 3: We calculated gender specific wage income regressions, using a two-stage estimation procedure to correct for the first-stage decision as to whether women participate or not in the market.

Step 4: Using different target rates for the female labor force participation (i.e., 29 percent as the specified short-term target of the Government and 40 percent as a longer-term target), we computed the number of women that would additionally enter the labor market, and then ‘moved’ the resulting additional women into the labor who were *not* participating before but who had the highest probability of participating according to the previously calculated probabilities (from step 1 and 2).

Step 5: We estimated hypothetical incomes for these women using the Mincer-equations and the estimated parameter values from step 3. This assumes that the returns to education and other assets do not change albeit the labor force supply increases. [Given that most of the women entering the labor market would earn relatively modest incomes, such assumption would be justifiable given that the labor demand curve for relatively low incomes is highly elastic {World Bank 2009a}].

Step 6: Lastly, we calculated the change in household income and consumption, assuming that the additional household income would increase actual consumption in full. We are hence able to assess (i) the change in overall income of all households (which would provide a lower bound estimate – since it does not take multiplier effects into account); and (ii) changes in the poverty rate.

⁷⁰ The poverty rate is computed using per capita income (instead of consumption) and the poverty line used by TUIK.

⁷¹ Household non labor income is assumed to remain unchanged.

⁷² A variable for educational attainment in completed years is constructed using the categorical variable for completed levels of education available in the HBS 2006 survey.