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SOUTHMOD – simulating tax and benefit policies for development

Unemployment insurance and income protection in Ecuador: an application of ECUAMOD

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Abstract: This note describes a method to assess the effect of unemployment insurance reforms in ECUAMOD, the tax-benefit model for Ecuador. The note is based on ECUAMOD version 1.4 and the Net Replacement Rate add-on built in the model to simulate transitions from work to unemployment in the underlying microdata. The add-on is used to assess the effect of the introduction of the Unemployment Insurance (UI) benefit in Ecuador in 2016.

Key words: unemployment insurance, income protection, microsimulation

JEL classification: C81, H55, I3

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1 Introduction

This technical note has been produced alongside a WIDER working paper (Jara 2018) assessing the effect of the Unemployment Insurance (UI) benefit on income protection in Ecuador.[1] The paper and the technical note are based on ECUAMOD version 1.4. The aim of this note is to describe the methodology used to assess the effect of UI through the simulation of transitions from work to unemployment.

This note is divided in two sections discussing two aspects of the methodology used in the paper. Section 1 describes the Net Replacement Rate (NRR) add-on that was created in EUROMOD to calculate NRRs and participation tax rates (PTR) by simulating transitions from work to unemployment for individuals observed to be working in the data. NRRs and PTRs are indicators of work incentives at the extensive margin of labour supply. The former measures the fraction of disposable income that will be kept when moving to unemployment, whereas the latter measures the proportion of earnings in employment that would be kept in the form of increased benefits or reduced taxes and social insurance contributions in the event of unemployment. As such, both measures also capture the extent to which the tax-benefit system provides income protection in unemployment. Section 2 describes the assumptions needed for the simulation of UI in Ecuador, some aspects of which could be generalized for other countries in SOUTHMOD using cross-sectional data.

2 Simulating transitions to unemployment with the NRR add-on

2.1 General aspects of the NRR add-on

The NRR add-on is a tool created in the EUROMOD platform which simulates disposable income in case of unemployment for all people observed with positive earnings in the data and calculates net replacement rates to unemployment defined as the ratio between disposable income in unemployment and disposable income in employment.[2] In practice, in order to simulate disposable income in unemployment, the NRR add-on replaces the values of earnings in the data by setting them to zero, but it also changes the value of other labour market variables to reflect the change in status from employment to unemployment (see Section 1.2).[3]

In the case of multi-earner households, the tool simulates household disposable income in unemployment separately for each earner. More precisely, imagine there are two earners in one household. The add-on first simulates a transition to unemployment for the first earner and calculates household disposable income in case the first earner would enter unemployment, keeping the labour market status of all other members unchanged (i.e. second earner in work). The add-on then simulates a transition to unemployment for the second earner in the household and

[1] This note was already available as a document since 2018, alongside the working paper. It is now formally published within the WIDER Technical Note series, as of September 2021.

[2] As such, the add-on could be referred to more precisely as an NRR to unemployment add-on. The tool also allows calculating participation tax rates to unemployment and in general, any other indicator based on incomes before and after entering unemployment.

[3] The NRR add-on has been developed and tested in a number of applications for EU countries (see for instance Gasior et al. 2017; Jara and Sutherland 2014; Jara and Tumino 2018).

calculates household disposable income in case the second earner would enter unemployment, keeping the labour market status of all other members unchanged (i.e. first earner in work).

More technically, the add-on makes use of the *Loop* and *UnitLoop* functions in EUROMOD to run two iterations in the tax-benefit model of a country:

- In the first iteration, the add-on runs the baseline results of the model, i.e. the results without making any change to the baseline input data or model.
- In the second iteration, the add-on runs the model after setting earnings to zero and modifying the value of other labour-market-related variables. As part of this iteration, the model calculates indicators of NRR for each earner in the data and produces an additional output data called cc_year_nrr,[4] which contains the variables produced by the NRR add-on.[5]

The add-on follows a harmonized structure to allow simulating transitions into unemployment for any country which uses the EUROMOD platform for tax-benefit simulations. However, the parameters used in the add-on would necessarily differ from country to country due to the different degree of information in the input data of different countries.

2.2 Specific aspects of the NRR add-on

In order to simulate disposable income in case of unemployment for individuals observed with positive earnings, a series of changes to variables in the input data need to be made. Most of the changes are related to the fact that the modified data (for the second iteration of the add-on) needs to reflect the change in the labour market status of the individual (from work to unemployment) in order to correctly simulate taxes and benefits in unemployment with the country models. Some other changes are related to assumptions made for the simulation of transitions to unemployment. We present a summary of the changes made to the variables in the input data in the remainder of this section.

Additional variables created for the use with the add-on

- *lnu*: variable used to identify the new unemployed, i.e. those transitioning to unemployment. The variable is set to zero in the first iteration of the add-on, but set to 1 in the second iteration for those individuals in the data with positive earnings (ils_earns>0).
- *yempv_a*: previous employment income, which is set equal to employment income (*yem*) before *yem* is set to zero. This variable is used to calculate the UI benefit amount, in case it is proportional to previous earnings in employment.

[4] cc stands for the country acronym. For instance, if we ran the NRR add-on for Ecuador in 2016, the model would produce the standard output data, ec_2016_std, but in addition it would produce the NRR output data, ec_2016_nrr.

[5] In countries where individuals in the data are observed to receive both unemployment benefits and earnings at the same time, an intermediate iteration is made, where the add-on runs the model after setting unemployment benefits in the data to zero. This is done to avoid having results which mix information on unemployment benefits from two different approaches: reported unemployment benefits and simulated unemployment benefits. The idea behind this intermediate step is to simulate unemployment benefits only for the corresponding period in which the person was in work. In practice, this step affects only a very limited number of observations.

- *liwmy_a*: months of contribution history, which is set equal to the number of months of work during the past year (*yemmy*) if available; otherwise, it is set equal to work history (liwwh). This variable is used to assess eligibility to UI.
- *lhw_a*: hours of work in previous employment, which is set equal to hours of work (*lhw*) before *lhw* is set to zero. This variable is sometimes needed in the simulation of UI, when the benefit amount depends on hours of work.

Main variables modified in the second iteration of the add-on

- *yem*: set to zero for the second iteration of the NRR add-on. All other variables related to employment income should also be set to zero, e.g. *yemot*.
- *yse*: set to zero for the second iteration of the NRR add-on. All other variables related to self-employment income should also be set to zero, e.g. *yseot*.
- *yag*: set to zero for the second iteration of the NRR add-on
- *kfb*: set to zero for the second iteration of the NRR add-on
- *yemmy*: set to zero for the second iteration of the NRR add-on
- *ysemy*: set to zero for the second iteration of the NRR add-on
- *les*: set to unemployed (les=5) for the second iteration of the NRR add-on
- *lhw*: set to zero for the second iteration of the NRR add-on
- *lcs*: set to zero for the second iteration of the NRR add-on
- *lfs*: set to zero for the second iteration of the NRR add-on
- *lunmy*: the duration of the unemployment spell needs to be defined as part of the transition to unemployment. One simple assumption is to set the duration of unemployment spell equal to the number of months in work before the transition (*yemmy*). In that case, they will be comparing household disposable income in work and in unemployment under the same period of time. As an alternative, if a variable for number of months in unemployment is not available in the data, one can define the duration of unemployment spell to 12 months to assess net replacement rates over the first year of unemployment

2.3 Harmonization issues related to the NRR add-on

The NRR add-on was developed to calculate net replacement rates in EU countries. The implementation of the NRR add-on for the case of Ecuador was relatively straightforward because of the high degree of harmonization of ECUAMOD with EU-country models in EUROMOD. Achieving a high degree of comparability across country models seems therefore important, not only for comparative analysis, but also to exploit the tools that have been developed for other countries in EUROMOD.

However, the specificities of microsimulation models for developing countries need to be considered in the analysis. An important difference in the simulation of transitions to unemployment is that for EU countries we assume that all employees contribute to social security and could therefore be potentially entitled to UI. For developing countries, UI should be simulated only for individuals who report affiliation to social security, as those not affiliated are not entitled to UI.

3 Simulating UI benefits with the NRR add-on

In this section, we describe the main characteristics of the Ecuadorian UI benefit and discuss the assumptions need for its simulation in ECUAMOD. Similar assumptions may apply to other countries, where only cross-sectional data is available for the simulations.

3.1 Simulating UI in ECUAMOD

Simulating UI with cross-sectional data is not straightforward. UI are contributory benefits, and in order to assess eligibility, information on past contributions to social security is required. This information is usually not available in the data. For this reason, UI are usually not (fully) simulated in EUROMOD. For EU countries, UI are only partially simulated in the baseline results of EUROMOD. This means that for those individuals reporting UI receipt in the data, EUROMOD assumes they are eligible to UI and simulates only the UI benefit amount they would be entitled to.

In the case of Ecuador, it is not possible to part-simulate UI in the baseline model. This is because data for ECUAMOD comes from ENIGHUR 2011–12, and the UI benefit was introduced only in 2016. Therefore, we have no information on individuals receiving UI in the data. For this reason, UI benefit was simulated only as part of the simulation of transitions from work to unemployment. The implementation of UI benefit in ECUAMOD for this paper has therefore not been incorporated in the baseline model for ECUAMOD.

Here, we describe the characteristics of the Ecuadorian UI and in the next section, we discuss the assumptions that need to be made due to the lack of information in the input data. The main dimensions characterizing the design of UI in Ecuador can be split in three:

a) **Eligibility conditions**. In order to be eligible to UI, the following conditions need to be fulfilled: (a) be affiliated to the general social security regime of the Ecuadorian Institute of Social Security (*Insituto Ecuatoriano de Seguridad Social*, IESS); (b) work as an employee; (c) have contributed to the social security system through an employer for at least 24 months, out of which six contributions need to have been made consecutively before entering unemployment; (d) be unemployed for a period of at least 60 days; (e) be unemployed involuntarily; (f) not be retired; and (e) apply for unemployment insurance from the 61st day of unemployment up to 45 days after.
b) **Benefit amount.** The UI benefit amount is based on the average earnings received over the last 12 months of employment. UI benefits are composed of a fixed and a variable part. The fixed part is financed through the employer social insurance contribution and is equal to 70 per cent of the national minimum wage (US$366 in 2016) per month. The variable part is financed through employee social insurance contributions and tops up the fixed component (if the employee contributory unemployment funds are sufficient) up to a maximum benefit amount of 70 per cent of average earnings received over the last 12 months. The first UI benefit payment is made on the fourth month of unemployment at the level of the maximum benefit. The benefit amount is then reduced 5 per cent every month until the eighth month (50 per cent of average earnings received over the last 12 months), after which entitlement to UI benefits stops.
c) **Benefit duration**. The maximum duration of payment is five months. At the end of the fifth month of the unemployment period, the employee can decide to withdraw the remaining of their unemployment fund as a lump sum or keep it in their individual account.

3.2 Assumptions to simulate UI in Ecuador

Based on the characteristics of the UI in Ecuador, the following assumptions were required for the simulation of UI:

In terms of the eligibility conditions:

- No information on the number of contributions made to social security is available in the data. Most cross-sectional surveys do not contain this information, which is essential to simulate eligibility to UI. Our input data also does not contain information on the number of months worked in the past year, which could be used as proxy for contribution payments over the last year. Instead, we assume that the number of months of contributions to social security is equal to the months of work experience reported in the data. Note that this might result in an overestimation of UI entitlement, because individuals currently affiliated with social security were not necessarily affiliated since the beginning of their work career.
- The eligibility conditions also require individuals to have at least six consecutive contributions before entering unemployment. This information is not available in the data, and our simulations assume that individuals with the required overall 24 contributions (i.e. 24 months of work experience) fulfil these eligibility conditions.

In terms of the benefit amount:

- The variable component of the UI is proportional to average earnings received over the last 12 months of employment. This information is not available in the survey, as employment income reported is that of the month before the interview only. Our simulations take these earnings as a proxy of the earnings base for the calculation of the UI benefit amount.

In terms of the benefit duration:

- Finally, an important assumption needed for the calculation of unemployment benefits for the new unemployed involves determining the duration of their unemployment spell. Here, we use a simplifying assumption of 12 months to focus on the effect of the UI over the first year of unemployment.
- For the purpose of our simulations, we assume that once the five-month payments have been exhausted, individuals keep their remaining contributions in their individual accounts. This assumption is made because we have no information on the amount each individual has accumulated in their individual accounts, so we can therefore not assess the effect of withdrawing the remaining funds.

3.3 Implications for the potential simulation of UI benefits in SOUTHMOD countries

The problems related to the simulation of UI benefits in Ecuador are not specific to this country. As previously mentioned, cross-sectional household survey data usually does not include information about contribution history. This is an essential variable for the simulation of eligibility to contributory UI benefits. Two potential variables to proxy this information were described in this note: (i) months of work over the last year and (ii) work history over the lifetime. Assessing whether UI benefits could be simulated in other SOUTHMOD countries would require checking whether these types of variables exist in the original datasets and have been integrated in the input data of the country models.

The methodology of simulating transitions into unemployment could be applied to other SOUTHMOD countries, independently of whether UI exists or not in the country. That would allow us to have an idea of the degree of income protection provided by the tax-benefit system in case of unemployment, and how to look at reforms to improve income protection in case this is limited, which is most likely the case in developing countries. A higher degree of harmonization across countries would then be needed in order to make use of tools which have been already developed in EUROMOD.

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