

Procurement of Consulting Services for Implementation of a Prospective Module About the Informal Economy in the IFs Model, in Order to Adapt it to the Case of Peru

Contract No. 13-2014-CEPLAN

Transmission Document • Deliverable 5 • Summary of the Descriptive Memory of the Project

This document provides a summary of the deliverables and supporting activities completed by the Pardee Center over the course of the *Procurement of Consulting Services for Implementation of a Prospective Module about the Informal Economy in the IFs Model in Order to Adapt it to the Case of Peru* project, based on the requirements as laid out in Contract number 13-2014-CEPLAN (see deliverables section below).

The following is an overview of the final products produced for this project.

1. *Final Report to CEPLAN on the Procurement of Consulting Services for Implementation of a Prospective Module about the Informal Economy in the IFs Model, in Order to Adapt it to the Case of Peru*

- A 133-page document detailing the informal economy (labor and production) and its treatment within the IFs model, from conceptual and definitional underpinnings, methods of measurement and data sources, and the drivers and impacts of informality, to model-development and Base Case and scenario analysis. This document includes discussion of the structure of the informal economy module in IFs and provides statistical justification for the specification of the model used. It also serves as Descriptive Memory of the Project, since it includes and details all activities undertaken.

2. *International Futures version 7.14*

- A new version of the IFs model that comes packaged with: (1) the completed informal economy module, which provides the ability to forecast and analyze informal labor and informal GDP shares for countries around the world, (2) the addition of a shadow economy sub-module with main variables, parameters, and switch, (3) multiple country-year data series capturing various aspects of informality, and (4) the ability to override the model's default historical database with project-specific data imported by the user.¹

3. *International Futures Economic Model Documentation*

- An updated version of the Documentation that includes detailed descriptions of the informal economy module, its structure, the variables used, the

¹ The IFs version 7.14 comes preloaded with Peru project-specific data (IFsHistSeriesProjectPeru) mostly from INEI.

relationships between variables, the exact equations modeled, and the parameters established. Includes separate descriptions of the model additions made in support of the shadow economy variable.

4. ***Guide to Scenario Analysis in International Futures***

- A new version of the *Guide* that includes an updated Economic Model section with added descriptions of the variables used in the informal economy module (and shadow economy submodule) and the various parameters (handles) users can use to affect the informal economy (or shadow economy).

5. ***International Futures User Training Manual***

- An updated version of the Manual that includes a new section on the procedure for overriding historical data for a particular country or countries with user supplied, project-specific data.

The following is a detailed look at each of the deliverables based on the CEPLAN contract.

Deliverable 1: Report with the details of the execution of activities a. and b.

- a. Conceptualization of the informal economy and its causes, including the understanding of the similarities and differences of the Shadow Economy (a concept generally applied in high-income countries). Elements of the labor market and production must be included. This activity must also include the identification of factors determining the size of the informal economy, based on the most recent literature. The scope must consider legal activities that are not part of the formal economy, but not illegal activities, such as drug trafficking.*
 - The Final Report to CEPLAN contains a full literature review that draws different conceptualizations of the informal economy from the most recent literature, including how each is defined and measured and the models and data used. The report considers both informal labor (by sex and inside and outside the informal sector) and informal production, including the determinants of the extent of informal labor and production and their forward linkages to overall economic productivity and growth.
- b. Identification and collection of data on the historical and current size of the informal economy, taken from accredited sources, such as projects and reputed organizations involved in this issue. The data must include differentiation by gender, residence, economic activity and other disaggregations available.*
 - International Futures version 7.14 contains 41 different historical series of country-year data concerning informal labor and informal production. The data on informal labor comes from ILO-WEIGO, the World Bank and INEI, and is broken down by sex, type of labor (e.g. construction, manufacturing, etc.), and sector (informal labor in the informal sector, informal household

sector, informal labor in the formal sector). The data on informal production comes from the UNECE and several model-based estimates by Schneider and Enste (2012), and Elgin and Oztunalli (2012), representing the size of the informal economy (UNECE) and shadow economy (Schneider, Elgin) as a percent of GDP. Further details can be found in Appendix A5 in the Final Report to CEPLAN.

Deliverable 2: IFs Training Manual and Scenarios Analysis Guide, both fully updated with the inclusion of the New Informal Economy Module, reflecting the completion of activities c., d., e., f., and g.

- c. *Recording in the IFs Model of the data collected and preliminary analysis required for the forecasts, including the longitudinal and transversal analysis of the size of the Peruvian informal economy, considering the determinants of the informal economy in relation to its size with respect to other countries.*
 - The Final Report includes a comprehensive description of the data collected for the project (see *b* above), initial analysis of the relationships between economic and human development indicators and informality, compares the extent of informality in Peru to that of other countries and its development over time. Further details can be found in Appendix A5 in the Final Report to CEPLAN.
- d. *Conceptualization and representation of the informal economy in the IFs Model, based on the analysis performed in points a) and c) and particularly on the dynamic relation between the informal and formal economy represented in the IFs Model.*
 - The Final Report and supporting Economic Documentation and Guide to Scenario Analysis detail both the drivers of informality, such as education years, tax rates, and government corruption, as well as the forward linkages from informality to other areas represented in the IFs model, such as total factor productivity.
- e. *Implementation of the informal economy representation in the IFs Model, including new variables, parameters and interrelations with a complete software coding for the appropriate representation. The modeling of the labor force in the IFs Model must differentiate the formal and informal employment (which must be sensitive to the global participation rate in the production activity and its relation to the demographic rates). Moreover, an alternative GDP simulation variable must be added, which captures the contribution of the informal economy in the official GDP.*
 - The Informal Economy Module in IFs version 7.14 represents informal and formal labor by sex and sector and as a share of total labor, and informal GDP as a share of informal GDP. The Informal Economy Module is fully integrated with the larger IFs model, i.e. informal labor is impacted by participation rates, demographic change, and even government policies. Details on the new variables, parameters, and interrelations added to the IFs model can be

found in the Final Report and in the supporting Economic Model Documentation.

- f. Inclusion of parameters allowing the analysis of informal-economy scenarios. These parameters are additional to the standard parameters of the system and will be included as multipliers that will be useful for the generation of scenarios.*
- The Informal Economy Module includes new parameters that control the relationships between the drivers of informality and the extent of informality and can directly modify informal labor and GDP shares. Each of these parameters represents a user-adjustable multiplier for the generation of scenarios. Further details regarding the use of these parameters can be found in the Scenario Guide.
- g. Analysis of IFs Model scenarios with the new informal economy module to verify that representation is robust and well-behaved, including stress tests and alternative parameterization of key relations. This will allow the preliminary exploration of secondary implications for different scenarios of the futures of the Peruvian informal economy.*
- IFs version 7.14 includes a set of scenario files that were developed to test model robustness and the parameterization of key relations. The scenarios include individual scenarios affecting the drivers of informality (1 for each), a counterfactual scenario which allows users to forecast a country's economic development should its informal economy be quickly eliminated, and a combined scenario, where all individual driver interventions are combined.
 - The Final Report includes a statistical appendix (A4) that describes the statistical methods used to specify and justify the models representing informal labor and production in the IFs system.

Deliverable 3: Documents of the New Informal Economy Module, including the structure, variables, dominant relations, causality diagram, equations, parameters and model use, reflecting the completion of the activities h and i.

- h. Creation of a form specialized in the IFs Model interface in order to visualize the informal economy with respect to the formal economy and perform comparisons.*
- IFs version 7.14 contains a specialized form “Informal Economy Display” that provides users with the ability to view and compare informal and formal economy forecasts, parameters, and historical data for all countries and country groupings in the model and across all scenarios.
- i. Prepare a report on the structure and the use of the new IFs model incorporating the Informal Economy Module, so as to be delivered to the CEPLAN personnel to be used in the preparation of future studies related to the informal economy issue.*

- The Final Report, Economic Model Documentation, and Guide to Scenario Analysis all provide detailed information on the structure and use of the Informal Economy Module within IFs.

Deliverable 4: New version of the IFs Model with the New Informal Economy Module integrated, reflecting the completion of activity j.

j. Presentation of a new version of the IFs Model incorporating the informal economy: the new version of the software package will be provided to CEPLAN together with the documents.

- A new version of the International Futures model, version 7.14 was developed for this project. IFs v7.14 is a standalone installation package and includes the following new features:
 - An informal economy module that forecasts informal labor shares (by sex and sector) and informal (and shadow) GDP shares for countries around the world and is fully integrated with the larger IFs model, including drivers of and forward linkages from informality.
 - A set of parameters enabling users to impact informal labor and GDP shares (directly or via drivers) and their forward linkages for scenario analysis.
 - 41 country-year historical data series on informal labor and GDP from reputable widely used sources.
 - Peru-specific data on informality from the INEI
 - An Informal Economy Specialized Display allowing easy access to the model's informal economy variables, parameters, and historical data and allowing comparison between countries and formal and informal economies.
 - A shadow economy variable as an alternative measure of informal GDP share
 - A switch that allows users to drive the model's forward linkages from informality with the shadow economy variable instead of the default informal economy variable.
 - An extended feature for the importing of project-specific data, allowing users to override the default historical database within IFs with their own data.
 - Full documentation of all new features added to the model including user guides.

Deliverable 5: Descriptive Memory of the Project, as closure of all the activities

The Final Report complemented by this document, being a summary of deliverables and all supporting activities, represent the required Deliverable 5.