

Cuban Integrated Financing Framework (CIFFRA)



POLICY NOTE N° 17 MACROECONOMIC MODEL FOR CUBA





The Joint Program “Support for the development of an Integrated National Financing Framework for the SDGs in Cuba” (CIFFRA) included, as part of its diagnostic exercises, the identification of the financing costs of the country’s development strategy until 2030¹. As part of this exercise, the ECLAC team developed a macroeconomic policy analysis model, which serves as a tool for the evaluation of counterfactual scenarios.

The model was designed on the basis of two fundamental blocks: (a) the development of a macroeconomic consistency matrix (MCM), and (b) the formulation, calibration, and solution of a quantitative model of consistency between stocks and flows that seeks to capture the salient features of the Cuban economy: high vulnerability to external shocks, high participation of the public sector in economic activity, fiscal dominance and limited development of the financial system.

The MCM corresponds to post-Keynesian inspired models that stress the importance of integrating financial and national income accounting. By bringing together all real transactions occurring in the economy and their counterpart in financial transactions, it provides a useful accounting framework for defining performance equations and establishing formal economic relations between the institutional sectors considered.

The design of the MCM was carried out by an ECLAC team, with the support of a student from the University of Havana, taking as a reference the matrices of transactions between institutional sectors (Godley & Lavoie, 2007), as well as the background for previous similar exercises carried out by Cuban academics (Hidalgo, Doimeadiós, Licandro and Licandro, 2011; León, 2015; Hidalgo and León, 2015). Figure 1 shows the general structure of the MCM.

One of the main challenges was data processing. On the one hand, there are information gaps that limit the design of this type of tool. On the other hand, the country’s dual currency brings about significant distortions in national accounts. Many of these distortions were corrected in 2021, the year in which the monetary overhaul took place. However, it was decided to use 2018, since it represents the most recent “non-atypical” year for Cuba. This allowed us to take its results as a reference for the analysis of structural relationships.

¹ See Policy Note 6 - Financing Gap Costing [on-line] <https://www.cepal.org/es/marco-integrado-financiamiento-cuba-ciffra>.

Table 1
Macroeconomic Consistency Matrix (MCM): variables

Actual flows	Institutional sectors					Rest of the world	Financial institutions (FI)		Total
	Enterprises	Capital	Households	Government	BCC		BC		
	Current								
Household consumption	+HFC		-CF _H					0	
Government consumption	+GFC			-CFG				0	
Inversion	+GFCF	-FBK						0	
Net exports	+NX				-NX			0	
Memorandum: GDP	[Y]								
Employee remuneration	-ER		+RT					0	
Net taxes on production & imports	-TPI			+IPM				0	
Memorandum: GOS	GOS								
Direct taxes	-DT _E		-ID _H	+ID				0	
Profit distribution	P _E	+UI _E		A _E				0	
Internal transfers	+ITR _C		+TR _H	-TR				0	
Net external transfers	+RE _E		+RE _H	+DO _G	-T			0	
Savings-investments	S _E	IN	S _H	S _G	CAB			0	
Nominal flows	Institutional sectors					Rest of the world	FI		Total
	Enterprises	Households	Government	BCC	BC				
Cash						-CA		+CA	
Bank reserves				+BR	-BR			0	
Deposits	-DEP _E		-DEP _H			+DEP		0	
Net credit to the government				+CNG		-NCG		0	
Net credit to the financial system						-NCF	+NCF	0	
Net credit to the non-bank public		+CR _E	+CR _H				-CR	0	
Δ Net external assets	-EA _E			-AE _G	+NEA		-EA _B	0	
Foreign direct investment		+FDI			-FDI			0	
Δ NIR					+NIR	-NIR		0	
Δ Net financial worth	NFW _E	NI	NFW _H	NFW _G	KAB				

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

Note: Signs of transactions denote sources (+) and uses of resources (-) for the different institutional sectors.

The matrix was developed in dollars to discount dual currency-induced distortions in the calculation of most macroeconomic aggregates. To validate the assumptions made, several discussions were held with Cuban and ECLAC experts, as well as with representatives of the Ministry of Economy and Planning (MEP), the National Statistics and Information Office (ONEI) and the Central Bank of Cuba (BCC).

Eight separate balance sheets were prepared for the MCM: (i) Gross Domestic Product (GDP) from the perspective of demand and income; (ii) fiscal balance; (iii) balance of payments; (iv) balance sheet of depository corporations; (v) corporate income and expenditure; (vi) household income and expenditure; (vii) balance sheet of the central bank; and (viii) balance sheet of other depository corporations (the balance

sheets of depository corporations were expressed in variations).²

The MCM is a particularly useful tool for macroeconomic analysis, policy coordination and planning in Cuba, which remains available for national authorities. The exercise for 2018, as values were estimated in USDs, allowed for a better understanding of the main macroeconomic aggregates and the economic reality of the country. The process for its preparation, estimation and discussion contributed to filling in “information gaps” and calibrating diagnostics on Cuba’s macroeconomic challenges.

On the basis of MCM inputs, a stock and flow model were developed that used 44 variables³ as starting point. Since the matrix captures all flows between economic sectors (horizontal consistency), as well as the use and destination of resources within sectors (vertical consistency), 43 equations were required to solve it.

For this purpose, interactions between six institutional sectors were considered:

- ▶ households, which supply labor to the production process, demand final consumer goods and services, and save money;
- ▶ the business sector, where it is assumed that all the national goods and services of the economy are produced;
- ▶ the governmental sector, responsible for public administration functions;
- ▶ the financial sector where a distinction is made between the central bank and other depository corporations (banks); and
- ▶ the external sector, which summarizes the rest of the world in a stylized form.

For the definition of performance equations, a thorough review process of the available literature and information was carried out, to ensure they would reflect the peculiarities of economic relations in Cuba, among which the following stand out:

- ▶ The relevance of foreign trade relations for a small, open economy with strong restrictions on access to international capital markets. In this sense, the Cuban economy is a typical case of balance of payments constrained growth.
- ▶ High vulnerability to external shocks, given the concentration of foreign trade, the predominance of services exports and the structure of imports .
- ▶ The use of administrative controls for current account adjustment, essentially by reducing imports in the vis-à-vis negative shocks on exports. This stems precisely from the severe restrictions on external financing: low attraction of foreign direct investment (FDI) and limited access to foreign financing.

² A total of 46 variables were used, out of which, 11 were taken from official statistics and two from international sources. Six variables were drawn up from budgets, 12 are residues and 15 were calculated on the basis of accounting entities. Despite 2021 was an atypical year (combined impact of US sanctions, COVID-19 pandemic, and the Monetary Overhaul), an MCM was prepared for that year, for comparison and validation purposes of the 2018 MCM and the methodology approach.

³ It includes the 46 variables of the MCM, adding 4 intermediate variables and 2 additional variables that capture the rationing of household final consumption and the availability of foreign direct investment. In turn, other variables that can be omitted from its specification were subtracted, by imposing equality between supply and demand.

- ▶ Limited capacity to react to fluctuations in the supply of goods and services due to the inconvertibility of the Cuban peso, especially in the business sector.
- ▶ Supply-side constraints to growth, due to structural deficiencies due to the sanctions and the limitations of the economic model.
- ▶ Limited development of the financial system and absence of a public debt market to finance the fiscal deficit.
- ▶ Existence of widespread controls over price variables, which often evinces monetary imbalances through banking and business excess liquidity, and pressures to enhanced inconvertibility of the Cuban peso.

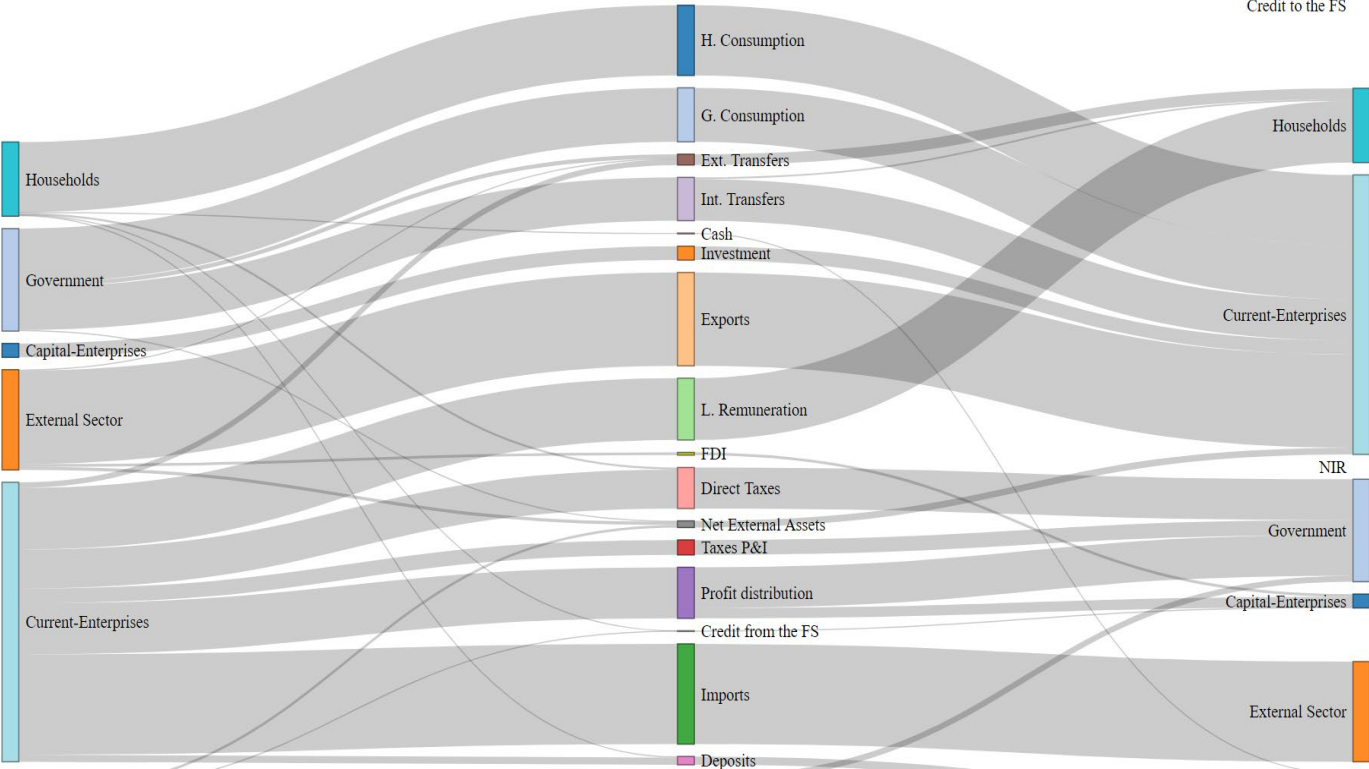
Based on these elements, the model assumes five fundamental lines of assumptions: (i) the dynamism of key components of aggregate demand depend on export performance (external constraint), which limits growth potential; (ii) exports depend on both external constraint and productive capacity; (iii) there may be mismatches between supply and demand in key markets, such as household final consumption goods and services, and Foreign Direct Investment (FDI); (iv) the financial system is rudimentary and poorly integrated with the rest of the economy; and (v) efforts to increase investment depend on reforms in public finance management, FDI attraction policies and business management.

Diagram 1 shows the flow of resources among the various institutional sectors drawn up on the basis of the solution of the baseline scenario of the model. In general, it confirms the predominant weight of the state business sector in the economy's transaction flows, the high levels of government intermediation in business activity, the insufficient investment flows and the low levels of financial intermediation.

To complement the financing gap costing exercise, alternative scenarios were estimated according to which investment could be increased by attracting more FDI under different assumptions regarding the fiscal policy and the role of the financial system. This confirmed, using a quantitative tool, the warnings made by other CFFRA exercises about the lack of financing sources to achieve 2030 development goals, as well as the need to bet on efficiency gains as a priority alternative in the Cuban context.

In order to facilitate the use of the tool for macroeconomic policy analysis, a technical capacity-building workshop on the model and the “R” programming language was held for Cuban officials. A student from the School of Economics of the University of Havana worked with the ECLAC team in the development of the model, and wrote his Bachelor's Degree paper on the subject. He is currently an official of the Ministry of Economy and Planning. Ultimately, it was not only about carrying out a specific exercise, but also building medium-term capacities for use and continuous improvement.

Diagram 1
Sankey Diagram



Source: Economic Commission for Latin America and the Caribbean (ECLAC).

CIFFRA Technical Committee - November 17, 2022



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