

EVALUATION SUMMARY THEMATIC EVALUATION

EMPLOYMENT AND VALUE- ADDED EFFECTS OF AGRI VALUE CHAIN INVESTMENTS



FACTS

CLIENTS

Multiple

COUNTRIES

Multiple

CONSULTANT

Ecorys NL

JOINT IMPACT MODEL (JIM) FACTS

COVERAGE

65 sectors, 75 countries, 17 regions

KEY OUTPUTS

Estimation of jobs and value-added supported

METHODOLOGY

Input-output modelling

KEY DATA SOURCES

GTAP, ILOSTAT

INTRODUCTION

One of the main avenues for development finance institutions (DFI) to achieve development impact is through supporting jobs and economic growth across markets.

These are also amongst the yardsticks that are most often measured. However, while data on jobs at the company level can be straightforwardly collected from customers, jobs generated indirectly in the value chain (through demand for supplies) or induced (through the income spending of employees of the company) are more challenging to capture.

Instead of going to each supplier and related businesses to gauge how many jobs are supported, economists use economic models that combine theory with economic data to simulate the interdependencies between a country's different sectors and quantify the impact of an investment or shocks on that economy. One of the most widely used methodologies for this purpose is input-output modelling.

BACKGROUND

Joint Impact Model

FMO, together with other DFIs and MDBs, has developed the Joint Impact Model (JIM), or “the model”, as a tool to estimate economy-wide impacts, such as total jobs supported (which is reported in FMO’s annual reports) and value-added (which is as of the time of the study not reported). The JIM uses input-output modelling to estimate these effects of a financial institution in emerging economies. The model offers a manageable solution for organisations, such as FMO, to quantify the impact of its work in the economies. As part of the EDFI harmonisation, several DFIs have worked together to ensure the JIM’s measurement and reporting on impact is done consistently and comparably to evaluate global development needs and priorities, assess the effectiveness of investments, and drive impactful actions.

FMO includes key customer-level information (including revenues, direct jobs supported, country and sector), which the model complements with large publicly available datasets to derive the estimates. The model is primarily used for reporting the economy-wide impacts of its portfolio, not for other purposes such as individual decision-making for investments. This use acknowledges that the JIM, like all economic models, represents a simplified version of the economy and will never fully capture its complexity, especially in the countries where FMO operates and where data availability is often limited.

Building Prospects

FMO has managed the Building Prospects (BP) fund on behalf of the Dutch government since 2002. The fund’s primary objective is to drive private sector development and job creation in developing countries through investments in the agricultural sector and the enabling infrastructure. As agriculture is considered an essential sector for driving economic development and creating local employment, Building Prospects finances high-risk investments along the agribusiness value chain (AVC) in emerging markets.

Previous studies confirmed that there is strong evidence that DFI investments in agriculture and agribusiness in lower-income countries contribute to increased GDP and have a higher impact on GDP growth than, for instance, investments in the industry. There is also strong evidence that private sector development through value chain strengthening in agriculture generates employment (equivalent to or more than other sectors, e.g. manufacturing). However, the impact within the agricultural value chain (AVC) has rarely been disaggregated, especially for developing countries.

Objective and scope

The objective of this evaluation was to provide learnings to FMO regarding the use of the JIM in its portfolio of agri investments. To this end, the study covers the following:

- Provides a focused review of the JIM and its applicability to the agri portfolio. This includes assessing the databases used by the JIM in light of the characteristics of FMO’s agri portfolio, the client data inputted into the model, and the assumptions used by the model.
- Estimates the development results in terms of employment and value-added achieved by the agri investments along the agri value chain. This includes using a reviewed version of the model to establish the characteristics and impacts of investments and complementing this analysis with findings from case studies with nine FMO clients and their suppliers.
- Provides recommendations to the JIM and FMO on how to improve both the measurement of impacts in terms of jobs and value-added and the development results that originate from these investments.

In terms of scope, the study focuses on the modelling approach to direct, indirect, and induced impacts of operational investments in FMO’s agri portfolio undertaken through mostly debt and one direct equity, including both Building Prospects (BP) and FMO-A funds.

Methodology

The study’s methodological approach was based on four basic methods: Literature Review, Desk Review, Model Assessment, and Case Studies. In particular, the desk review included a review of information of the entire agri portfolio to collect and compare additional optional inputs to the model. The Case Studies, on the other hand, collected direct, in-depth information from ten FMO clients and their suppliers with the objective

of assessing the current client representation used by the JIM and the Development Impacts of FMO investments, complementing and validating the results of the JIM.

FINDINGS AND RECOMMENDATIONS

Model-related findings:

Higher-level reflections on JIM

The study confirmed that the JIM methodology is in accordance with current market practices and addresses well the trade-off between investment-level precision and the need for a practical portfolio-level impact measurement solution. The study also confirmed that the JIM is the most granular I/O model currently available for financial institutions that covers all relevant emerging countries.

FMO's use of the JIM is in line with the use of input-output models by other development finance institutions, although this is quite different to how academic literature uses these models. The foundational use case of I/O models is to look at inter-industry linkages, where a whole sector is the unit of analysis, whereas FMO currently uses the model to estimate portfolio-level effects. Given our review of the model and its results, FMO should continue to limit its use of the JIM to this purpose, as it would not be appropriate to use the JIM to make individual sector or client investment decisions.

FMO's choice to also include some of the optional inputs, specifically direct jobs and taxes, enhances the quality of the JIM estimations. FMO's choice to gather additional primary data from its clients for these variables should thus continue in order to ensure the quality of the JIM estimates.

The JIM relies on the GTAP database to produce the Social Accounting Matrices (SAMs) that form the core pillar of the model. Having reviewed the alternative databases available, the study confirmed GTAP is the best choice to obtain a comprehensive coverage of the countries and sectors of interest to FMO.

The basic assumption of the JIM and I/O modelling is sound: positive upstream effects (i.e. contribution to jobs through the supply chain or through the spending of employee income) relate to positive demand shocks and reflects a key mechanism by which indirect effects tend to materialise.

Model-related recommendations:

Recommendations for how FMO can improve its use of the JIM:

1. *Improve the process to ensure correct sector, segment and country categorisation for each client*

The basic required inputs to the JIM are the clients' NACE sector and country classification. The JIM uses this information to assign the enterprise to the corresponding country-sector on which all model estimations will be based. Unsurprisingly, our assessment indicated very clear benefits of providing the best possible data regarding the sector and country of the firm. In a few cases, we found completely wrong sector and country classification, whereas in a few other cases, we observed that the FMO client could be classified in a more specific and precise sector. Even slightly more specific classifications at the NACE 4-digit level could change the sector translation to GTAP sectors, affecting the quality of estimations. Correcting these errors can be done at a relatively low cost, by reviewing company documents or consulting client employees.

Some of the classification errors are due to a firm operating across multiple countries or being vertically integrated across multiple parts of the value chain. In these cases, it is important to adjust to the part of the business most affected by the loan, if possible. If this is not possible, and a catch-all sector must be used, our research finds that using "wholesale" as the default category causes the most distortion and so should be avoided where possible.

Supportive findings:

From the 52 firms reviewed in the desk research, we identified 4 cases where the country classification could have been assigned more precisely, and 15 cases where the sector classification could have been assigned more precisely. Improving these categorisations significantly enhances the robustness of the estimates. For instance, the median error observed for estimates of total wages drops from 268 to 10% once these errors are corrected, and the median error for intermediate consumption from -31 to -26%. Across the sum of the portfolio, supply chain employment increases by 19% once the correction is done.

2. Reduce the bias in the estimations of direct and indirect effects of FMO agri-clients by collecting optional inputs, using correction factors and accounting for imported inputs.

- a. Add more optional inputs to the model, particularly wages for the most relevant clients in the portfolio

The model's required inputs are the country, sector and revenue of the client. It can also integrate four main optional inputs, of which FMO already includes two: direct jobs and taxes from data reported by clients. Adding the other two would greatly enhance the accuracy of the model outputs as they help capture the heterogeneity of the investments. Given the inputs FMO already includes, adding wages would reduce the current overestimation of direct value added by almost half on average. Adding also EBITDA brings these errors to zero.

Moreover, adding optional inputs increases the overall estimation of jobs supported by FMO. This happens because optional inputs also reduce the corresponding underestimation of intermediate consumption by FMO clients. The latter, in turn, is a key variable for estimating indirect value added and indirect jobs. Consequently, the increase in intermediate consumption increases indirect jobs results without affecting direct jobs, which are manually inserted by FMO and remain unaffected.

Nonetheless, adding more optional inputs would come at a significant cost for FMO. The study confirmed that collecting this information is time-consuming and that there is no harmonisation in the reporting of wages and EBITDA components by clients. We thus recommend FMO collect information on wages only from the main clients, which together have a significant impact at the portfolio level regarding employment.

Below, we suggest an alternative and less costly approaches to reduce the current bias of the model.

- b. If adding more additional inputs is not possible, use correction factors to account for the overestimation of direct and underestimation of indirect effects.

Applying a correction factor could be done either as an FMO agri-specific interface (similar to the one developed by KfW) or could be picked up by the JIM foundation. In our results, the inflation factor for intermediate consumption of 46% would correct the average underestimation of intermediate consumption.

While using a correction factor would be in line with what is done by KfW, it may make FMO's data less comparable with other DFIs. If FMO prefers this route, it would be beneficial to rather advocate for the JIM Foundation to make this change. In this case, the factor would have to take into account the average bias across all users' portfolios.

It is important to highlight that a combination of recommendations 2a and 2b is possible. FMO could collect optional inputs for a selection of relevant clients while applying a correction factor for the remaining portfolio. This would be preferred to applying a correction factor only.

- c. Account for imported inputs in the JIM input data

The JIM also allows the inclusion of local sourcing by clients amongst its optional inputs. Our case study results indicate that the absence of information about imports is likely a source of overestimation in the indirect effects (value added and jobs) of FMO clients because FMO clients tend to be more import intensive. As for the examples discussed above, FMO could incorporate the higher imports of its clients into its use of the JIM in two ways: either including local sourcing as an optional input collected from clients or estimating import intensities across its portfolio and using these to calculate a correction factor.

The first option would involve periodically requesting clients to inform their local purchases, while the second option would require collecting this data from a sample of clients and using it to calculate the appropriate correction factor for the entire portfolio. While the latter would be less costly – as also less precise – the correction factor would also reduce comparability with other DFIs and benefit from discussions with the JIM Foundation for broader adoption, as mentioned above for 2b.

Supportive findings:

Both the literature review and our analysis of the case studies support the importance of capturing firm heterogeneity. FMO clients deviate from the model's base – based on sector averages – in several ways. They tend to be more productive, less job-intensive, and in most cases, more import-heavy with greater upstream integration. This results in the model persistently and considerably underestimating intermediate consumption and overestimating total value-added and wages. The study shows that the underestimation of intermediate consumption, combined with a higher prevalence of imports and upstream integration across the FMO portfolio, distorts value chain estimates of employment impact significantly.

Recommendations for the JIM Foundation

3. Consider increasing the level of granularity of the JIM by integrating national-level databases whenever possible.

Increased granularity of data helps estimations become more precise. Although the JIM is the most granular I/O model that covers all low- and middle-income countries in the same scope, it remains on the lower end of granularity with its 64 sectors. As such, the JIM could consider augmenting the model with national-level databases.

Two possible approaches in that direction would be the following:

- Employment intensities could be collected across different countries, for which these are available in national statistics and integrated into the JIM for these cases only. Estimations from academic studies could also be used. While this is a possibly costly path, it is likely the only solution to improve employment estimations, given the absence of international data with a coverage broader than ILO's.
- Using ad-hoc expert-based assessment of employment intensities. An assessment could be done regarding differences in labour intensities across different GTAP sectors using the available empirical evidence in the literature, for example, to correct and redistribute these factors within agriculture and manufacturing. An example is provided by aquaculture, which shares the same labour intensity as the other 13 agri sectors in GTAP but is notably less labour-intensive in practice.

4. Drop the assumption of no sourcing from other agricultural firms to enhance the estimation.

Currently, the model assumes no sourcing from other agricultural firms. However, this is based on the idea that much agriculture is done at a subsistence level. While this may apply at a country level, this is not the case for FMO clients. Both our case studies and our model analysis suggest that this assumption should be dropped. Dropping this assumption corresponds better with the underlying methodology of GTAP and general SNAs. If dropped, in our estimates, this increases the portfolio level jobs by 18%, fully from indirect effects, while not affecting value add, supply chain or direct employment effects.

Supportive findings:

The idea behind Auxiliary assumption 6 was to exclude non-market transactions because “a large share of the agriculture sector in low- and lower middle-income countries is subsistence farming”. Therefore, sourcing by agricultural companies from other agricultural companies and private sector consumption of agriculture is put to zero.

As per our review, this assumption is not strictly in accordance with the System of National Accounts (on which the GTAP tables are based) for two reasons:

- Estimating household production for internal consumption usually presents complications, and it remains unclear the extent to which this is done in low and lower middle-income countries, as well as the share of these transactions in total estimated production. Consequently, there is a high probability that this assumption results fully or to a large extent in the exclusion of market instead of non-market transactions. In that sense, it would have been important to present the underlying data or research on which this assumption is based.
- Related to the above, even if most agriculture production registered in GTAP indeed represents subsistence production, transactions between sectors register goods and services that are being sold to other economic units. Thus, by definition, they hardly represent household production for their own consumption.

Further, most of the impact related to Auxiliary Assumption 6 is connected to induced employment and not to supply chain effects. Thus, in practice, the assumption relies on the idea that agri-consumers in developing countries are mainly subsistence consumers. This assumption likely only holds at very low development levels.

Finally, the theory and case studies showed that related employment generation in agri value chains is very labour-intensive and frequently informal, which is how the JIM accounts for employment in these sectors when this assumption is not used, further indicating that Auxiliary Assumption 6 is not necessary.

Development impact findings:

What is currently working well in FMO's agricultural value chain investments?

Our review of the literature continues to support the importance of private sector investment to close the financing gap in the agricultural value chain. In addition, our recalibrated model suggests that the 52 FMO investments included in the analysis, which amount to an outstanding debt value of EUR 909 million, have contributed to more than 146,000 local jobs. The composition is about 9% direct, 30% induced and 61% in supply chain effects, mostly across low and lower-middle countries, in Asia and in Africa. Regarding segments, we observe that FMO investments in manufacturing have supported more jobs, especially induced and supply chain ones. Services come in second place, and primary production last. FMO investments have contributed to three times more informal than formal jobs; and have also been more associated with male employment, although female employment has been relevant, accounting for 38% of total employment across the portfolio.

For Building Prospects specifically, 29,966 jobs were supported, of which 3,549 were directly supported, 13,719 jobs through induced effects, and 12,698 jobs through supply chain effects. In addition, while overall, FMO investments show greater impact when in manufacturing, within the Building Prospects portfolio specifically, FMO's investments have had a bigger impact in expanding primary sector jobs.

Our case study analysis showed several positive trends in how FMO investments create indirect jobs. They exemplify in practice how indirect jobs and value-add are supported through CAPEX- and OPEX-expansion. The case studies showed examples of how an increase in the revenue at the client level led to higher revenues for the suppliers upstream.

FMO's investments have also facilitated quality-enhancing strategies for agri products, which help producers and/or processors to capture higher value-added or market shares.

Development impact recommendations:

How could FMO enhance its impact when making agricultural value chain investments?

5. *Consider an increased focus on manufacturing/processing and low-income countries.*

The evidence from the JIM suggests that FMO investments have been supporting jobs in the Primary and Tertiary (Services) segments of the value chain. However, the FMO investments that support these indirect effects were made predominantly in manufacturing. The evidence from the JIM also indicated that investments in low-income countries provide, by far, the best development results in terms of jobs supported.

It is important to highlight two caveats related to the above. Firstly, it is easy to find opportunities across primary and service segments that provide chances for impacting direct and indirect employment/value-added generation beyond those offered by manufacturing and processing in general – and these opportunities should be continuously explored. Secondly, we do not consider the quality of jobs generated in the study. To a large extent, the higher employment generation in low-income countries is caused by the higher presence of lower productivity and informal activities in these countries, which tend to be labour-intensive, and the jobs supported are likely to be of lower quality. Nonetheless, they can still be significant in terms of impacting a high number of lives and livelihoods.

Supportive findings

The JIM highlights that the typical linkages between manufacturing and other economic activities, sometimes in less advanced segments of highly heterogeneous developing countries, can provide an opportunity for multiplying impacts across the economy. The number of jobs supported per euro invested is 813 per million euros for investments in low-income countries, while the portfolio average is 161. Relatedly, Africa provides the biggest return in terms of jobs, at 307 jobs per million euros, and the analysis confirms that manufacturing investments connect to more jobs per million euro investment.

This is confirmed across several Case Studies, in which we see instances of FMO clients that impact a great variety of local suppliers.

6. *Consider an increased focus on firms that have a business model aimed at developing in-country (or regional) sourcing or support outsourcing.*

The evidence of the study indicates that processing enterprises that develop sourcing from local suppliers, especially through supplier development programmes, have the strongest impact in terms of supporting businesses and livelihoods. FMO clients have supported small upstream suppliers by, for example, creating new sources of demand, diversification possibilities, and promoting quality in the value chain. Alternatively, by internalising upstream segments, clients can also impact local economies positively, but this model might create

enclaves of excellence around which linkages to local producers remain thin. At the other extreme, companies that source heavily internationally might see a reduced local impact compared to the other two cases.

One caveat is that prioritising enterprises that develop local suppliers should not be done while ignoring contextual factors. Vertical integration or importing are crucial to enable high-impact investments to take place under challenging local conditions.

Supportive findings

Investments in low and lower-middle income countries face significant hurdles in terms of local infrastructure, institutional quality and skills development. Frequently, local conditions are inhospitable for developing a deeper network of local suppliers, and companies tend to rely on global value chains instead of regional or local ones to build their own supply chains.

The case studies showed that in some cases, supply chain effects are thinner for FMO clients due to more frequently importing supplies from abroad or integrating upstream activities within the business (creating enclaves of excellence).

7. Maintain social and environmental responsibility requirements.

Results from the case studies indicate that FMO clients have increased female employment and ensured no direct informality exists. We observe across the study that FMO clients tend to be among the 'best' enterprises in operation in their respective countries. In addition, we found indications that catalytic effects across value chains are also happening beyond FMO clients. The evidence is anecdotal and non-conclusive but points to a possible channel by which FMO investments can have a deeper and transformative impact across the economic structure in developing countries.

MAIN FINDINGS

- The JIM is the only model we are aware of that is capable of capturing the employment and value-added effects of a global portfolio focused on low- and middle-income countries
- The literature on the impact of private sector investments is clear on the need to close the financing gap in agri value chains but highlights heterogeneity in the impacts of private sector investments.
- As FMO's AFW clients differ structurally from the average company in their respective sector and country (e.g. by being more productive and more import-intensive), there are structural biases in results.
- The case study evidence suggests informality across the direct (first-tier) supply chains of FMO clients is lower than what is usually estimated by the model due to better sourcing practices of these enterprises.
- Investments in low-income countries provide the largest number of jobs created per euro invested. Africa provides the biggest return in terms of jobs and manufacturing investments connect to more jobs per euro investment.
- Better access to finance leads to two base mechanisms for investments to generate more jobs and value-added: capital expenditure driven expansion and operational expenditure driven expansion. Quality enhancing strategies and firms' local sourcing business model also affect the extent to which value and jobs are created along the value chain.

MAIN RECOMMENDATIONS

On a strategic level, I/O modelling provides FMO with a simple, theoretically sound, and broadly accepted method for estimating – and comparing – the direct and indirect effects of its worldwide portfolio of investments. Nonetheless, given its well-known limitations and simplifying assumptions, the estimations from the JIM should always be seen and communicated as a first approximation of the impact FMO is having on jobs and value added across the world at portfolio level.

Against this backdrop, nine recommendations are proposed:

- Maximize the use of optional inputs.
- Careful assessment of sector/segment and country of client.
- Explicitly take into account the overestimations of direct effects and underestimation of indirect effects
- Account for imported inputs in the JIM input data
- Consider increasing the level of complexity of the JIM methodology to integrate national level databases, whenever available
- Do not use Auxiliary Assumption 6.
- Consider an increased focus on manufacturing/processing and low income countries
- Consider an increased focus in firms that have a business model aimed at developing in-country (or regional) sourcing or support outsourcing
- Maintain Social and environmental responsibility requirements