



# Indonesia:

## Methodological considerations in planning for job rich growth



International  
Labour  
Organization

### Employment projections for job rich growth<sup>1</sup>

Employment projections are one way to analyze labour markets. They provide policy makers, employment services and education providers with valuable information on the employment outlook, which can help to make policies and services more responsive to the needs of the labour market. For example, employment projections can be used by policy makers to understand if there are potential challenges and opportunities emerging within the labour market that require special measures to assist workers and employers. Employment services and education providers can use employment projections to support job seekers in making career choices. Jobseekers and students can use the projections in informing their career choices and in selecting areas of study and training. In addition, policy makers involved in education and training may use employment projections to determine if incentives are needed to encourage skill development in certain occupations and industries.

Employment projections are produced periodically by Ministries of Labour across the world in collaboration with research institutes in order to provide an overview of the employment outlook for the coming years. Employment projections are usually disaggregated by industry and occupation, as well as educational attainment, gender and region. For example, in Europe Cedefop regularly provides detailed data and results of the latest medium-term forecasts of skill supply and demand in most countries, which includes disaggregated employment projections.<sup>2</sup>

In Indonesia, the Ministry of Manpower and Transmigration provides employment projections on a biennial basis, which are published in the National Manpower Planning document.<sup>3</sup> Employment projections are provided for labour supply and demand by sector and occupation, and these projections are then used to estimate unemployment on the basis of differences in supply and demand. Based on projections and other information, policy makers identify interventions that aim to reduce unemployment.

1 This policy brief was supported by the Korea/ILO Partnership Programme.  
2 <http://www.cedefop.europa.eu/en/about-cedefop/projects/forecasting-skill-demand-and-supply/skills-forecasts.aspx>.  
3 MOMT (2013) National manpower planning, 2013-2014, Secretariat General, Ministry of Manpower and Transmigration, Jakarta.

In Indonesia employment projections are currently used predominantly at the policy level and are only provided in broad levels of disaggregation (9 sectors and 7 occupations). It may be beneficial to make further use of employment projections across a range of labour market institutions, as they provide useful information for students and job seekers.

The purpose of this briefing note is to provide a discussion on a range of employment projection methodologies in order to provide recommendations on employment forecasting in Indonesia. It reports the results from several models and identifies implications for policy that refer to methodology, data and usage of projections in policy planning and in service provision.<sup>4</sup>

### Employment projections methodologies

In generating employment projections, it is generally preferred to use a combination of forecasting methodologies, as all methods have strengths and weaknesses and a combined approach can provide policy makers with more credible information on the employment outlook.<sup>5</sup> In addition, using several forecasting methodologies can lead to increased forecast accuracy and a reduction in errors. It is also common practice to combine quantitative methodologies with qualitative methods, including inputs and evaluations from social partners.

There are a range of methodologies that can be used to generate employment projections. This includes demand-side models that use multiplier frameworks based on input-output tables, as well as time series models and econometric models that use univariate and multivariate regression techniques. For example, the Ministry of Manpower and Transmigration in Indonesia uses a sectoral simultaneous equation econometric model to generate employment projections.

Models are often costly to develop and maintain. In some cases, it may be more beneficial to develop one model, and use this model in combination with other methods, rather than maintaining several models concurrently. In such a context, it

4 This briefing note was prepared by Emma Allen and Kee Beom Kim with contributions from Theo Sparreboom. It draws on the technical workshop on employment targets and projections which was held in Jakarta, November 2013.  
5 Timmermann, A 2004, 'Forecast Combinations', Handbook of Economic Forecasting, vol. 1, no. 1.



becomes important to review a range of methods, so that an optimal approach can be identified. Therefore, at the request of Bappenas, the ILO prepared additional forecasts from three employment projection models to support a policy dialogue on methodological considerations in planning for job rich growth (see table).

**Table: Employment projection methodologies<sup>9</sup>**

Model	Description
Indonesia Employment Projection Model (IEPM)	The IEPM follows the ILO-Inforum approach <sup>7</sup> and is based on the 2008 Input-Output table, Sakernas microdata and projections of GDP growth by expenditure category. The IEPM uses endogenously determined productivity ratios or exogenous assumptions on labour productivity growth to obtain employment projections by sector. The model uses industry-occupation-status coefficients, which follow historical trends (2007-2012) to obtain projections across these variables. The model provides employment projections for 22 economic sectors and for occupations at the 3 digit ISCO level. IEPM is a demand-side model, and therefore does not provide labour supply projections or identify imbalances.
Exponential Smoothing With Damped Trend model (ESWDT)	The ESWDT model is a univariate approach to forecasting that describes a time series by its evolving “level” and “trend”. The ESWDT algorithm is implemented through a Microsoft Excel VBA programme that was developed by the Department of Employment in Australia. <sup>8</sup> The ESWDT for Indonesia is based on historical trends (1997-2013) observed in the labour force survey for occupations and industry. The model does not include parameters related to national accounts or population growth. Employment projections were prepared for 9 economic sectors and 8 occupations.
ILO Global Employment Trends (GET) Econometric Model	The ILO’s GET model is a multivariate econometric model that produces estimates for unemployment, employment, status in employment and employment by sector, disaggregated by age and sex for 178 countries. The model provides information on supply and demand in order to understand trends in unemployment. Due to the scope and purpose of the model, it only provides information at aggregate levels. <sup>9</sup>

Source: ILO Country Office for Indonesia and Timor-Leste.

6 The data requirements for developing employment projections typically consist of an input-output table, the latest information from national accounts by economic sector, forecasts for gross domestic product, and a time series of microdata from the labour force survey. Indonesia has a time series of data dating back to 1990 that can be used to generate employment projections

7 For a more detailed explanation, see El Achkar Hilal, S.; Sparreboom, T.; Meade, D. 2013. ‘The Philippines Employment Projections Model. Employment targeting and scenarios’, Employment Working Paper, No. 140, International Labour Office (Geneva); [http://www.ilo.org/employment/Whatwedo/Publications/working-papers/WCMS\\_213378/lang--en/index.htm](http://www.ilo.org/employment/Whatwedo/Publications/working-papers/WCMS_213378/lang--en/index.htm)

8 For a more detailed explanation see <http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections>

9 See Annex 4 in ILO. 2013. Global Employment Trends 2013. Recovering from a second jobs dip, International Labour Office (Geneva); [http://www.ilo.org/global/research/global-reports/global-employment-trends/2013/lang--en/index.htm?utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A+FullPolicyNewsUpdate+\(Full+policy+news+update\)](http://www.ilo.org/global/research/global-reports/global-employment-trends/2013/lang--en/index.htm?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+FullPolicyNewsUpdate+(Full+policy+news+update))

Different models are designed to serve various purposes, and therefore have different levels of detail and draw on different assumptions. For example, the Global Employment Trends (GET) Model aims to provide information on a selected number of key labour market indicators for a large number of countries. The GET model identifies imbalances in supply and demand that are important for understanding trends in unemployment and other indicators.

The Indonesia Employment Projections Model (IEPM) and the Exponential Smoothing With Damped Trend model are designed to provide more detailed information on occupations and economic sectors. For example, the IEPM’s occupation by industry matrices provides information that is important for education and skills policies, particularly for identifying potential bottlenecks in demand for skills.

In addition, the IEPM can provide employment projections across a range of scenarios. In particular, the employment projections presented in this brief build upon three macroeconomic reference scenarios, including a baseline scenario with real GDP growing at an average annual rate of 6.0 per cent during the forecast period (2013-2019), a ‘low growth’ scenario (4.5 per cent) and a ‘high growth’ scenario (7.5 per cent).

## Employment outlook: Results from a combination of forecasting methodologies

Employment in Indonesia is expected to continue to grow as Indonesian reaps the benefits of a demographic dividend which will see the number of people that are part of the working age population increase.<sup>10</sup> By 2019 Indonesia’s labour force is projected to have increased to at least 126 million people and the number of people employed is expected to reach between 118 and 123 million people (see table). With unemployment projected to remain relatively steady, it is expected that employment growth will continue to outpace the growth of the labour force. The labour force participation of young women is expected to increase, due to benefits from greater access to education and training, and it will be important that strategies are in place to support these women to access emerging employment opportunities.

10 Indonesia is currently experiencing a “demographic bonus” or “demographic dividend”, which refers to a high percentage of the population that are of working age and a low dependency ratio.

**Table: Employment projections of key labour market indicators for 2019**

Variable	Baseline 2013	IEPM (GDP growth rate)				ESWDT	GET
		4.5%	6%	7.5%			
Working age (millions)	180.0	191.8	191.8	191.8	191.2	193.0	
Labour force (million)	120.2	129.4	130.3	131.2	126.1	130.0	
Employed (million)	112.8	120.6	122.4	123.6	118.9	123.0	
Unemployed (million)	7.2	8.8	7.9	7.6	7.4	7.7	
Labour force participation rate	69.2%	67.5%	67.9%	68.4%	66.0%	67.4%	
Employment-to-population rate	62.7%	62.8%	63.8%	64.4%	62.2%	63.7%	
Unemployment rate	5.7%	6.8%	6.1%	5.8%	5.9%	5.9%	

Source: ILO Country Office for Indonesia and Timor-Leste.

As the forecasts provided by the IEPM illustrate, Indonesia's unemployment situation will be influenced by the rate of economic growth, however it is projected that unemployment will remain close to 6 per cent by 2019. Given the projected fast growth of the working-age population, and Indonesia's history of high youth unemployment, it will be important that employment policies support school-to-work transition in order to avoid the emergence of a situation of structural unemployment.

Employment projections across sectors of the economy indicate that structural change will continue to unfold until 2019, entailing the movement of workers from primary to secondary and tertiary sectors. These structural changes are likely to have implications for labour productivity and prosperity

in Indonesia. The agricultural sector has traditionally absorbed a large number of workers in Indonesia, however, employment growth in this sector is projected to slow, with the expansion of urbanization and the increasing educational attainment of workers. Employment within the manufacturing is projected to grow rapidly, with recent reforms associated trade and investment policies paving the way for the expansion of this sector. In connection to this, the trade sector is also expected to quickly expand.

Employment in community, social and personal services is also projected to grow rapidly, driven in part by increasing educational attainment of the labour force on the supply side and the increasing purchasing power of the growing middle class who will consume these services on the demand side.

**Table: Employment projections of key labour market indicators for 2019**

Variable	IEPM (GDP growth rate)			
	4.5%	6%	7.5%	ESWDT
Agriculture, Forestry, Hunting and Fishery	-0.6%	-1.6%	-2.7%	0.4%
Mining and Quarrying	1.2%	1.1%	0.7%	6.0%
Manufacturing Industry	1.3%	2.1%	2.9%	1.9%
Electricity, Gas and Water	5.8%	6.6%	7.3%	0.2%
Construction	3.9%	5.1%	3.9%	1.0%
Wholesale Trade, Retail Trade and, Restaurants and Hotels	2.5%	2.9%	3.3%	1.6%
Transportation, Storage and Communication	-0.9%	-0.2%	0.4%	1.1%
Financing, Insurance, Real Estate and Business Services	4.1%	4.1%	4.0%	0.3%
Community, Social and Personal Services	3.5%	4.6%	5.7%	1.9%
Total	1.4%	1.7%	1.8%	1.2%

Source: ILO Country Office for Indonesia and Timor-Leste, Jakarta. \* In February 2014 Statistics Indonesia revised the population weights for its labour force survey and provided backcasting for the time periods between February 2011 and August 2013. The employment projections provided were developed in January 2014 and are therefore based on the original population weights in the SAKERNAS microdata files.

Structural changes will also have implications for the factor composition of the labour force across skills and occupations. Employment is projected to expand for professionals and technical occupations by 2019, and it is projected that there will be up to an additional 5 million people working in these occupations. Professional and technical occupations in the highest demand are likely to be associated with science,

mathematics, health, engineering and management. Employment is expected to decline for unskilled and low skilled labourers in the agricultural sector, with this sector shedding a minimum of 1 million agricultural labourers by 2019. In terms of absolute number, the bulk of new jobs created will be for service workers and production labourers, as employment in the services and manufacturing sectors expand.

**Table: Projected average annual growth rates for employment by sector until 2019**

Variable	IEPM (GDP growth rate)			
	4.5%	6%	7.5%	ESWDT
Professional, Technical and Related Workers	5.0%	6.2%	7.4%	1.4%
Administrative and Managerial Workers	4.3%	5.3%	6.3%	1.3%
Clerical and Related Workers	4.1%	5.2%	6.2%	0.8%
Sales Workers	2.3%	2.5%	2.8%	1.3%
Services Workers				1.8%
Agriculture, husbandry, forestry, fishery, hunting workers	-0.7%	-1.7%	-2.9%	0.4%
Production and related workers	0.5%	0.9%	1.3%	1.9%
Transport and equipment operators	0.9%	1.7%	2.4%	
Labourers	1.9%	3.0%	3.9%	
Total	1.4%	1.7%	1.8%	1.2%

Source: ILO Country Office for Indonesia and Timor-Leste.

## Identifying an optimal approach

On the one hand, a benefit of the IEPM is that it allows for employment projections to vary in accordance with GDP growth assumptions, as it uses endogenously determined productivity ratios and/or exogenous assumptions on labour productivity growth to obtain employment projections by sector. The development framework of Indonesia places economic growth at its core, with it anticipated that economic growth will see poverty decline and employment expand. Therefore, an employment projection model that is based on an employment multiplier framework is highly suitable for the Indonesian context.

However, it should be borne in mind that the economy and labour market in Indonesia is characterized by what is termed as a ‘two-speed economy’, due to differences in productivity across the spectrum of formality. A formal segment, which uses reproducible capital and employs wage workers coexists with a non-formal segment, which relies much more on less skilled labour together and uses natural resources and simple production methods. Therefore, it is important that an employment multiplier framework is used to analyze which part of the economy is driving growth and which part might be excluded.

On the other hand, the ESWDT model has the benefit of closely following trends provided in a time series of data. That is, employment forecasts from this model are based on employment trends rather than output-to-employment elasticities. This approach has benefits for examining occupational and sectoral growth trends, but weaknesses in accounting for fluctuations due to economic shocks or economic booms. Another weakness of this model is that it does not use information on population growth projections. It is therefore recommended that the ESWDT model be combined with another model, such as an Autoregressive Integrated Moving Average model, in order to improve the reliability of forecasts.

Modeling in Indonesia faces several limitations associated with data quality and the duration of the time series. For example, the time series of the labour force survey has a number of gaps, which made it only possible to use annual data from August

1997 onwards. Similarly, it was not possible to disaggregate projections by sex and occupation due to the low number of observations in some occupations. The level of detail provided on industrial and occupational classifications has also changed over time.

Finally, it is worth pointing out that the employment projections provided may be limited in their reliability due to the growth of the middle class and the increasing wealth of households. To further illustrate, currently social protection systems are limited and a large proportion of households are near poor. This means that many people have no choice but to participate in the labour market in order to support themselves and their families. With the expansion of social protection and wealth in the future, more people may be able to ‘afford’ to remain unemployed for a period of time or may decide not to participate in the labour force. Therefore, with Indonesia rapidly developing its economy and society, data from historical trends needs to increasingly be reviewed in the light of development policy.

Based on an understanding of the data environment in Indonesia and the review of methodologies for developing employment projections, an optimal approach to forecasting in Indonesia would draw on either a combination of projection models or one model combined with other methods. A combination of forecasting methodologies and/or other methods is likely to provide a more credible and defensible understanding of the employment outlook, particularly as all methods have strengths and weaknesses and a combined approach can be used to overcome limitations. Other methodologies should be considered depending on the purpose of the analysis.<sup>11</sup> In particular, it made be useful to combine a model that provides information at the more aggregate level, with a method that provides more detailed projections for occupations, such as the IEPM.

<sup>11</sup> For example, various methods can be used to anticipate skills needs alongside or in combination with employment projection models; see Wilson, R.A.; Tarjáni, H.; Rihova, H. A Practical Guide on Anticipation and Matching of Skills at Sector Level, Cedefop, European Training Foundation, Warwick Institute for Employment Research and International Labour Office, forthcoming; and Sparreboom, T.; Powell, M. 2009. ‘Labour Market Information and Analysis for Skills Development’, Employment Working Paper, No. 27, 2009 (Geneva); <http://www.ilo.org/public/english/employment/download/wpaper/wp27.pdf>.

## A note of caution: Adjustments through validation

Even the most robust of models may produce projections that do not accurately reflect the situation on the ground. Economic models of today are based on historical data and do not take the future decisions of policy makers into account. Therefore, once projections have been generated, it is important to validate the results in light of known future industry developments, policy interventions and other socio-economic trends. Information that can support the validation processes can come from a combination of desktop research or from consultations with workers, employers and experts from academia. Such information may be viewed as another type of 'independent' forecast that should be considered before the finalization of employment projections.

The process of validation may involve the review of a range of research articles and other official datasets that provide information on investment and economic activities, as well as the comparison of results with projections from other agencies. Consultations should also take place among experts within the Ministry of Labour that have information on redundancies, skills shortages, and employment placement, as well as with experts from other line ministries and industry peak bodies.

While it is important to invest in the validation of employment projections, it is also imperative to acknowledge that all forecasting and projection methods have limitations. There are some shocks to the economy that no method can consistently and accurately forecast. For example, models tend to have a limited understanding of natural disasters, political unrest and the global financial crisis of 2008, in terms of when they might occur or in terms of the scope and scale of the impact of such shocks. Therefore, the forecasts and projections that are provided by models should be used with caution.

## Policy implications

A number of implications arise from the review of methods for generating employment projections for Indonesia, including:

- ◆ As all methods have strengths and weaknesses, **an optimal approach** to forecasting would draw on either a combination of projection models or one model combined with other methods. Such an approach can provide policy makers with more credible information on the employment outlook, however, it is important to consider the costs of the development and maintenance of such models, and possible alternative approaches should be taken into account.
- ◆ Methodologies used to develop employment projections should be explainable, defensible and credible. They should also be **manageable** in terms of technicality, and in terms of production and maintenance ease, by the human resources available within the employment planning units of the Ministry of Planning and the Ministry of Manpower and Transmigration.

- ◆ Employment projections are supported by **data** and in order to optimize the utility of employment projections for supporting employment planning and the provision of employment services, it would be beneficial for micro data from the labour force survey to provide detail on employment at the ISIC 5 digit level and the ISCO 4 digit level.<sup>12</sup> This would allow policy makers to develop a more precise understanding of demand and help to avoid a situation of skills mismatch.

In order to sustain employment growth, development strategies need to have productive employment and livelihoods as a core objective, and monitoring systems to support the implementation of this objective need to be in place. Employment projections are an important part of a system for monitoring labour market outcomes, which can build on more conventional systems that track key labour market indicators.<sup>13</sup> Projections provide policy makers with information on the employment outlook and can help to identify different types of labour market interventions that are needed to address emerging challenges.

In addition to their role in monitoring employment, employment projections should be used as a form of labour market information by employment services and in education and skills training contexts. Employment projections provide occupational profiles that employment services, career guidance counsellors and training providers can use to help students and job seekers develop their skills and career in areas where demand is emerging. Indonesia currently provides projections for 9 sectors and 7 occupations. More detailed projections for occupations would be useful supporting the choices of individuals and for developing a labour force that is more productive and competitive. In this regard, a model such as the IEPM would be most suitable.

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<sup>12</sup> ISIC = International Standard Industrial Classification; ISCO = International Standard Classification of Occupation.

<sup>13</sup> Sparreboom, T. 2013. 'Labour market information and analysis systems', Chapter 10 in Perspectives on Labour Economics for Development (edited by S. Cazes and S. Verick), International Labour Office (Geneva); [http://www.ilo.org/global/publications/books/WCMS\\_190112/lang--en/index.htm](http://www.ilo.org/global/publications/books/WCMS_190112/lang--en/index.htm)