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*Decent Work Inter-Regional SAM
Modelling with Employment Satellite
Extension Including Regional
Infrastructure Scenarios*

Case Study 2005 IRSAM

J.V. Alarcon and C. Ernst

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Preface

The primary goal of the ILO is to work with member States towards achieving full and productive employment and decent work for all. This goal is elaborated in the ILO Declaration 2008 on Social Justice for a Fair Globalization which has been widely adopted by the international community. Comprehensive and integrated perspectives to achieve this goal are embedded in the Employment Policy Convention of 1964 (No. 122), the Global Employment Agenda (2003) and – in response to the 2008 global economic crisis – the Global Jobs Pact (2009) and the conclusions of the Recurrent Discussion Reports on Employment (2010 and 2014).

The Employment Policy Department (EMPLOYMENT) is engaged in global advocacy and in supporting member States in placing more and better jobs at the centre of economic and social policies and growth and development strategies. Policy research and knowledge generation and dissemination are essential components of the Employment Policy Department's activities. The resulting publications include books, country policy reviews, policy and research briefs, and working papers.

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Foreword

This study, prepared under EU funding and on request by the Indonesian government, has the ambition to understand the inter-regional dynamics in terms of economics, but also in terms of employment and Decent Work (DW) dimensions. It tries to showcase, with the help of simulations, on how to combine macro policy instruments more effectively with inter-regional characteristics, i.e. by identifying the most important “within” region activities, main natural resources, strategic or privileged location and how each region relates to the other regions. Its ultimate goal is to provide insight into how to enhance different types of regional programmes and investments of certain main regional sectors and how such investments relate to higher region’s growth and regional employment creation for different types of workers. The study uses the Social Accounting Matrix methodology for ex-ante “decent employment” impact assessment of key sectoral policies in Indonesia. Such approach builds on work developed by the ILO, EMPINVEST, on Dynamic SAM and Inter-Regional SAM and the indicators compiled and analyzed in the case of Indonesia.

More concretely in the case of Indonesia this decent work study aims to test its application by applying to the inter-regional IRSAM the SAM modelling methodology, which is intended for an ex-ante impact assessment of key public policies on different dimensions of decent work including quantitative and qualitative aspects of labour market, such as job creation, working time, wages or earnings, working conditions, social protection, labour rights, pension rights, etc.

The study takes into account the Economic Development Plan of the country, the MP3EI, in order to assess key policies on decent work, within a broad question on the impact of the implementation of the MP3EI on economic growth, income distribution and employment. The study focuses the analysis at provincial level by taking into account the economic corridors identified in the MP3EI, and based on the potentials and strategic roles of each major island - Sumatra, Java-Bali, Kalimantan, Sulawesi, Bali-Nusa Tenggara, Papua-Moluccas - as well as the selected provinces for which decent work indicators have been compiled and Decent Work Profiles developed under the EU funded MAP project, and the main regions selected within the IRSAM: Sumatra, Java & Bali, Kalimantan, Sulawesi, East Indonesia.

Decent work indicators derived at provincial and sectoral level have various dimensions. The classification of the regional economic activity employment classification are limited to employment related indicators (with breakdowns by gender status, formal/informal, precarious), wages/earnings and poverty in terms of decent-work indicators, gender wage gap (with inferences about social protection and safe work environment). The indicators have been quantified using available aggregate data per region, using researched similar cases as well as appropriate proxies and by running several rounds of iterations. Although all estimations have been fully validated they should be considered as placeholders. Hence, the present study is primarily meant to illustrate the application of SAM model methodology by extending it to a regional SAM and combining with decent work indicators. The value added of this study has been to use a SAM type model to analyze inter-regional dynamics combined with employment data, which also includes quality aspects referring to DW dimensions.

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Abstract

This paper intends to assess the impact of key public policies on regional development on different dimensions of decent work including quantitative and qualitative aspects of employment, with the help of an Inter-Regional Social Accounting Matrix (IRSAM). The analysis will focus at provincial level by taking into account the economic corridors identified by the State, and based on the potentials and strategic roles of main regions selected within the IRSAM.

Ex-ante impact analysis using IRSAM provides insight into how to enhance different types of regional programmes, i.e. simulations regarding regional economic growth potentials, via different types of investment in the development of main regional sectors and how such investments relate to higher region's growth and regional employment creation by job profiles. The backward linkages by main region reflect the impact when injections are made in each of the five regions. Each column of linkages has two levels. The first measures impact on the region itself or partial backward linkage (main diagonal blocks) and the cross-regional impacts (off diagonal blocks), the second level measures the impact within a region economic activity and the cross-account impacts on Factors of Production and Institutions.

With regard to decent work, only three main indicators have been built due to regional data limitations: Precarious work, "Informal" Employment within each Region and Employment by status in terms of self-employment, paid and unpaid worker. The criteria should suggest in which sectors and in which regions vulnerability in terms of the lack Decent Work as demonstrated by suffering from very precarious work levels, high informal labour and very high un-paid work indicators.

Key words: SAM model. Economy, Decent Work, labour multipliers, simulations, inter-regional dynamics.

Contents

Preface.....	iii
Foreword	v
Abstract	vii
Glossary of IRSAM Terms and Indicators.....	x
1. Employment and Decent Work Impact Assessment Pilot Study The case of Indonesia.....	1
1.1 Introduction to IRSAM and DW indicators	1
1.2 Scenario Simulations Using the 2005 IRSAM for Indonesia	2
1.3 IRSAM Modelling and Main Regional Characteristics	3
1.4 Regional Employment and Decent Work (DW) Indicators Satellites.....	7
2. IRSAM 2005 and Inter-Regional Model and Types of Regional Indicators.....	9
2.1 IRSAM Regional Indicators and Cross Regional Backward Linkages.....	9
2.2 IRSAM Cross Regional Correlations and Regional Potential Indicators.....	10
2.3 Java & Bali Activity Total, Partial and Cross Region Multipliers.....	11
3. IRSAM 2005 Regional Employment Satellite: Labour Impact Indicators.....	15
3.1 Regional Average Sector Factor Labour Incomes	15
3.2 Regional Labour-Output Ratios (Lab/GVOR).....	17
3.3 Java & Bali Cumulative and Cross Labour-Activity Linkages.....	20
3.4 Sulawesi Activity Cumulative and Cross Labour-Activity Linkages	21
4. “Classic” Scenario Simulation and Implications for Strategic Policy.....	23
4.1 Java & Bali Activity Simulation Infrastructure Impacts.....	24
4.2 Sulawesi Activity Simulation Infrastructure Impacts	24
5. Decent Work Indicators by Region, Gender, Region Comparisons and Results	27
5.1 Decent Work Criteria and Indicators	27
5.2 Regional Decent Work Indicators.....	29
5.3 Regional Decent Work Indicator Results.....	30
5.4 Summary Precarious Work Averages for National, Regions and Gender	34
6. Decent Work Tentative Conclusions and Recommendations	35
References and ILO DySAM Reports.....	37
Annex Tables and Graphs	41

Glossary of IRSAM Terms and Indicators

SAM: Social Accounting Matrix

ESAM: Extended Social Accounting Matrix with Satellites

EIRSAM: Extended Inter-regional Social Accounting Matrix with Satellites

IRSAM Type Indicators: Five regions each with three main endogenous accounts Factor Income (FP); Production Activities (PA) and Institution Income (IN). Exogenous accounts: local and national Government, taxes, fix capital and stock variation and rest of the world (subscript “i” indicates region)

Regional Economies IRSAM Equation: $IRSAM: Y = [I - RAPS] = Ma X$

RAPS: Regional average propensity to spend (analogous to I-O technical coefficients)

RMa: Regional matrix of all five region multipliers; 5 x 5 blocks of matrices

Regional Endogeneity Degree: Sum of column elements of the main diagonal block of the RAPS of a region

Regional multipliers $R_i Ma_i$ (PA_i , FP_i and IN_i); where subscript “i” indicates region

Total Regional Backward linkages (T RBrdLkg): Sum of all column elements of the regional multipliers matrix $R_i Ma_i$ (similarly for Forward Linkages but row wise)

Partial Regional Backward linkages (PRBrdLkg): Sum of column elements within a region including all main accounts (FP, PA, IN); main diagonal block in regional multipliers matrix $R_i Ma_i$ (similarly for Forward Linkages but row wise)

Partial Regional of Factor of Production Income Account Backward linkages (PRFPBrdLkg): Sum of column elements of only FP account block from the main diagonal block of regional multipliers matrix $R_i Ma_i$ (similarly for Forward Linkages but row wise)

Partial Regional of Production Activity Account Backward linkages (PRPABrdLkg): Sum of column elements of only PA account block from the main diagonal block of regional multipliers matrix $R_i Ma_i$ (similarly for Forward Linkages but row wise)

Regional Cross Region Backward linkages (CRBrdLkg): Sum of column elements across regions in the off diagonal block of regional multipliers matrix $R_i Ma_i$ (similarly for Forward Linkages but row wise)

Regional Cross of Factor of Production Income Account Backward linkages (CFPRBrdLkg): Sum of column elements for each region only for FP in the off-diagonal block of regional multipliers matrix $R_i Ma_i$ (similarly for Forward Linkages but row wise)

Regional Cross Production Activity Account Backward linkages (CPARBrdLkg): Sum of column elements for each region only for PA in the off-diagonal block of regional multipliers matrix $R_i Ma_i$ (similarly for Forward Linkages but row wise)

Regional Leak Accounts $R_i L = R_i B * Ma_i * R_i X$; Regional Leak Multipliers $R_i B Ma_i$

Regional Scenario Simulation Impacts

EIRSAM – Expanded IRSAM with Satellite Type Indicators

Regional Labour Satellite – IRESAM solution formula: $L_i = R_i \lambda_i R_i Ma_i X_i$;

$R_i \lambda_i$ = regional labour/output ratio

$R_i \lambda_i R_i Ma_i$ = All regions Employment Multipliers Matrix

Total Regional Activity Employment linkages: Sum of all column elements of the regional employment multipliers matrix $R_i \lambda_i R_i Ma_i$

Regional Cumulative Activity Employment Linkages: Sum of column elements within each region for the each of the main accounts (FP, PA, IN) in the regional employment multipliers matrix $R_i \lambda_i R_i Ma_i$

Cross Regional Cumulative Activity Employment Linkages: Sum of column elements within each region for the each of the main accounts (FP, PA, IN) in the regional employment multipliers matrix $R_i \lambda_i R_i Ma_i$

Regional Direct Activity Employment Multiplier: Single main diagonal elements within a region for production activity accounts (PA) in the regional employment multipliers matrix $R_i \lambda_i R_i Ma_i$

1. Employment and Decent Work Impact Assessment Pilot Study The case of Indonesia¹

Alarcón J. V², Ernst C³

1.1 Introduction to IRSAM and DW indicators

This study has the ambition to understand the inter-regional dynamics in terms of economics, e.g. production, infrastructure, transport, communication, transfers and remittances, but also in terms of employment and Decent Work (DW) dimensions. It tries to showcase, with the help of simulations, on how to combine macro policy instruments more effectively with inter-regional characteristics, i.e. by identifying the most important within region activities, main natural resources, strategic or privileged location and how each region relates to the other regions. Its ultimate goal is to provide insight into how to enhance different types of regional programmes and investments of certain main regional sectors and how such investments relate to higher region's growth and regional employment creation for different types of workers. The study uses the Social Accounting Matrix methodology for ex-ante "decent employment" impact assessment of key sectoral policies in Indonesia. Such approach builds on work developed by the ILO on Dynamic SAM and Inter-Regional SAM and the indicators compiled and analyzed in the case of Indonesia.

More concretely in the case of Indonesia the decent work study aims to test its application by applying to the inter-regional IRSAM the SAM modelling methodology, which is intended for an ex-ante impact assessment of key public policies on different dimensions of decent work including quantitative and qualitative aspects of labour market (jobs creation, working time, wages/earnings, working conditions, social protection, labour rights, pension rights, etc.).

The study takes into account the Economic Development Plan of the country, the MP3EI, in order to assess key policies on decent work, within a broad question on the impact of the implementation of the MP3EI on economic growth, income distribution and employment. The study focuses the analysis at provincial level by taking into account the economic corridors identified in the MP3EI, and based on the potentials and strategic roles of each major island (Sumatra, Java-Bali, Kalimantan, Sulawesi, Bali-Nusa Tenggara, Papua-Moluccas) as well as the selected provinces for which decent work indicators have been compiled and Decent Work Profiles developed under the MAP project, and the main regions selected within the IRSAM (Sumatra, Java & Bali, Kalimantan, Sulawesi, East Indonesia).

Decent work indicators derived at provincial and sectoral level have various dimensions. As a result of data limitations the classification of the regional economic activity employment classification are limited to employment related indicators (with breakdowns by gender status, formal/informal, precarious), wages/earnings and poverty in terms of decent-work indicators, gender wage gap (with inferences about social protection and safe work environment). The indicators have been quantified using available aggregate data per region, using researched similar cases, using appropriate proxies and by running several

¹ The research has been undertaken in the framework of the ILO, EMP/INVEST research, on initial request by CMEA (Coordinating Ministry of Economic Affairs), Indonesia)

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rounds of iterations. Although all estimations have been fully validated they should be considered as placeholders, i.e. the final derivation was attempted only after failing to obtain appropriate regional sectoral employment data, e.g. data provided showed only sectoral employment totals, the more detailed classification were provided only at the aggregate regional level. Hence, the present study is primarily meant to illustrate the application of SAM model methodology by extending it to a regional SAM and combining with decent work indicators.

1.2 Scenario Simulations Using the 2005 IRSAM for Indonesia

Ex-ante (scenario) impact analysis using IRSAM for 2005 provides insight into how to enhance different types of regional programmes, i.e. simulations regarding regional economic growth potentials, via different types of investment in the development of certain main regional sectors and how such investments relate to higher region's growth and regional employment creation for different types of workers. Such region-based analysis can provide helpful regional inputs for policy discussion and decision-making, for example, not least about how to combine macro policy instruments more effectively with inter-regional characteristics, i.e. by identifying the most important within region activities, main natural resources, strategic or privileged location and how each region relates to the other regions in terms of economics, e.g. production, infrastructure, transport, communication, transfers and remittances.

The overarching policy questions which guide the regional policy research are:

- How to select the most appropriate instruments and targets (investments, exports, sectors, resources, location, etc.) yielding the highest enhancing growth and employment, i.e. national economic and growth employment should be greater than the sum of the parts. And how regional policies on different forms of regional investment can enhance growth and the promotion of decent work employment.

The specific underlying research questions are:

- Which regional sectors should be stimulated to encourage regional growth and decent work employment creation?
- What sectors in each of the regional economies should be prioritized to provide decent work opportunities over the medium term?
- What type of regional oriented investment should be stimulated to support regional growth and decent work employment creation?
- How can existing regional positive economic linkages be enhanced and reinforced?
- What mix of regional and national policies would be the most appropriate for fostering decent employment creation?
- What inter-regional policy mix is likely to yield better outcomes with respect to the creation of decent work employment?

The core research tool aims to provide a national and regional perspective about growth and decent work employment. Thus the growth/employment promotion research focuses on regional advantages in terms of natural resources and main economic sectors and infrastructure.

Labour market analysis will be disaggregated as follows:

- Employment (precarious, informal, self-employment and unpaid worker)
- Gender
- Age groups, in particular youth
- Location, defined as rural and urban
- Decent work sector employment at the sectoral level

1.3 IRSAM Modelling and Main Regional Characteristics

The main characteristic of the IRSAM and the most relevant methodology aspects of the derivation of IRSAM model indicators, the employment satellite and the decent work profiles are presented next.

a. Endogenous and Exogenous Accounts

For modelling purposes in general, SAM/IRSAM modelling included, a separation of variables into endogenous. This setup allows assessment of all subsequent impacts on the endogenous and on satellite accounts resulting from external exogenous account changes.

To classify IRSAM transactions into endogenous and exogenous accounts the first criterion is in general but not exclusive to classify as endogenous the accounts specified a priori as objectives of study (or targets) in the IRSAM are regions' factors of production accounts (RFP); regions' production activities (RPA) and regions' households and companies (RIN). Exogenous are those accounts intended to be used as policy instruments, e.g. local and central government accounts, regional taxes and subsidies, central indirect taxes and subsidies, capital accounts of private, local and central government as well as those that are beyond the reach of national policy interventions, e.g. rest of the world (Current and capital account).

b. Policy Instruments and Exogenous Injections in IRSAM Modelling

Injection is a method by which interventions into the economic systems can be rendered. These interventions amount to designing simulations (scenario development and testing) with the purpose of understanding how the socioeconomic system works and make forecasts about the economy.

The injection process shows that for any given injection into any regional exogenous account (i.e. instruments) of the IRSAM, the influence is transmitted throughout the interdependent IRSAM system among the endogenous accounts following the circular economic flow. The interwoven nature of the system implies that the incomes of factors, institutions and production are all derived as impacts resulting from exogenous injections into the economy via a multiplier process transmitted directly or via induced processes.

c. Derivation of IRSAM Multipliers

The objective of IRSAM modelling is to use multiplier analysis to help understand the linkages between the different sectors and the institutional agents at work within the economy in the determination of output and incomes.

More specifically, after the determination of incomes as endogenous variables, the starting function is the mathematical definition of the incomes accruing to endogenous accounts, the derivation of the standard formula for the IRSAM in matrix form is:

$$RY_{(t, R)} = RT_{(t, R)} J + RX_{(t, R)} J \dots\dots\dots 1.1$$

Where:

RY = vector of total regional income/expenditures endogenous variables column vector

RT = IRSAM endogenous with endogenous transaction matrices

RX = column vector of regional exogenous expenditures on endogenous accounts, the injections that represent incomes of endogenous variables

t is time and R is region

J is vector to transform matrices into column vectors

If the average propensities to spend of endogenous variables ($APS_{(R)}$) are defined as the ratio of any entry $a_{ij(R)}$ to its total expenditure/income $RY_{j(R)}$, that is

$$Ra_{ij(R)} = RY_{ij(R)} / RY_{j(R)} = RT_{ij(R)} / RY_{j(R)} \dots \dots \dots 1.2$$

where $Ra_{ij(R)}$ is one element of the matrix of regional average propensities to expend ($RAPS_{(R)}$) is matrix $RA_{(R)}$. In other words, the IRSAM coefficients or average propensities to spend ($RA_{i,j(R)}$) are derived as the share of payment flows by endogenous accounts to themselves ($RT_{ij,R}$) to their corresponding outlays ($RE_i = RY_{j,R}$). Therefore, making $RT_{ij,R}$ explicit form eq. 1.2 and in matrix form the equation can be written as

$$RY_{j,R} = RT * J_{(t,R)} = RA_{(R)} RY_{(t,R)} \dots \dots \dots 1.3$$

Similarly, the average propensity to spend for the exogenous variables or the leak coefficients ($RB_{k,j}$) are derived from flows reflecting payments from endogenous accounts to exogenous accounts ($RL_{i,j}$) to the corresponding outlays ($RE_i = RY_j$).

$$RL * J_{(t,R)} = RB_{(R)} RY_{(t,R)} \dots \dots \dots 1.4$$

The average propensities to spend ($RAPS_{(R)}$) of endogenous ($A_{(R)}$) and exogenous ($RB_{(R)}$) accounts within the IRSAM framework are presented in the next table. In an IRSAM only a few endogenous $RT_{ij,R}$ and exogenous $RL_{kj,R}$ transactions are non-zero, correspondingly, in the matrix of average expenditure propensities for endogenous ($RA_{i,j,R}$) and exogenous accounts outlays ($RB_{k,j,R}$) the same transactions are also non-zero.

Further, after collecting similar terms and solving for $Y(t)$, the aggregate accounting multiplier (RM_a) can be calculated as follows.

$$RY_{(t,R)} = RA_{(R)} RY_{(t,R)} + RX_{(t,R)} = (I - RA_{(R)})^{-1} RX_{(t,R)} = RM_{a(R)} RX_{(t,R)} \dots \dots \dots 1.5$$

Where $RM_{a(R)} = (I - A_{(R)})^{-1}$ is the matrix of aggregate accounting impact multipliers, i.e. generalized Leontief inverse, and is a full matrix.

If an injection is done via any of the exogenous variables the mathematical formula that helps to calculate the full impact, e.g. the base run plus the injection effect run, reads as follows

$$RY_{(t,R)} + \Delta RY_{(t,R)} = (I - RA_{(R)})^{-1} (RX_{(t,R)} + \Delta RX_{(t,R)}) = RM_{a(R)} (RX_{(t,R)} + \Delta RX_{(t,R)}) \quad 1.6$$

The regional $RM_a(R)$ matrix is also known as the ex-post IRSAM accounting regional multiplier matrix. The $RM_a(R)$ contains all the information needed to “account” for a sequence of regional multiplier effects of exogenous injection when it travels throughout the regional economic system. Further, the $RM_a(R)$ multiplier matrix when decomposed into sequential contributing parts can help analyse impact in more detail, i.e. parts reflecting different mechanisms at work within the economic system, such as, primary income formation and then income distribution, demand and finally production response mechanisms; see next table.

Similarly to SAM modelling the $RM_a(R)$ matrix of regional multipliers can also be decomposed. However, for purposes of DW analysis, we do not consider relevant and thus is not presented here.

d. Injections and Simulation

Variations in any one of the regional and central exogenous account ($\Delta RX(R)$) help to simulate increases in total regional income $\Delta RY_{t,R}$, the total regional income impact is then measured by $(RY_{t,R} + \Delta RY(R))$ or the total endogenous impact calculated either by simply adding the increase to the base income or directly via their corresponding multipliers, e.g. post-multiplying matrix $RMa(R)$ by $(RX(t,R) + \Delta RX(R))$. In turn the total impacts are decomposed, see eq. 5.8, by post-multiplying instead the corresponding $RMa(R)$ intra-account and $RMa(R)$ induced impacts multiplier matrices by $(RX(t, R) + \Delta RX(R))$, thus capturing the partial strength of transmission of intra account and of induced channels.

More explicitly calculating only the incremental impact or net injection effect, e.g. excluding the base run, each decomposed impact can be expressed as:

Thus $\Delta RY(t,R)$ captures the sum of both incremental impacts (intra-account transfer + induced) on the endogenous accounts namely: (i) regional production activity or regional gross output (RPA); (ii) regional factor income returns (RFP) and (iii) regional household and companies (RHH&Co).

The national and regional-wide impacts, among others, of infrastructure investments can be examined by changing the total regional exogenous injection vector (e.g. local or central government current expenditure), central Government Investment (e.g. capital expenditures on infrastructure, machinery and equipment); other Investments demand (e.g. capital formation) and regional exports. More specifically, the regional or central exogenous accounts can be manipulated to estimate the effects on regional output (through the regional output multiplier), on regional value-added or GDP, (through the regional factor income multiplier matrix), and on regional household income (via the regional household income multiplier matrix).

e. IRSAM extension (EIRSAM) with a Reginal Employment Satellite

To measure impacts on employment and other non-money metric variables the IRSAM must be extended with the desired physical satellites⁴. Extensions, when attached to the accounting framework, can help perform more complex and encompassing money metric economic and non-money metric analysis. Hence, extended accounting-based modelling (EIRSAM) can be used to support and strengthen the process of developing coherent national strategies by, inter alia, analysing the effects of expenditure related policies, by among others, investment planning on the economy, employment and CO2 emissions.

For the current work the money metric 2005 IRSAM is, subsequently extended to measure only employment based on the 2010 DySAM satellite.

It should be noted that satellite modules must match the entries of the SAM in question (ESAM). The relations between the money metric SAM and the satellites can be made explicit by introducing the appropriate row and column entries connecting the satellites with the corresponding SAM accounts. Employment

In SAM/IRSAM modelling all impacts propagate via the endogenous account multipliers and employment impacts propagates in a similar manner as the exogenous or

⁴ In addition to employment SAM/IRSAM satellites can be as varied as, emissions social indicators, demographic information and morbidity satellite tables, to name a few. The general methodology on ESAM as well as the methodology on behavioural labour satellites is based on Alarcon (Revision 2007) and Alarcon, van Heemst and de Jong (2000). There are other methodologies, e.g. SESAME (Keuning, 1994) and UNSD Integrated environmental and economic accounts, 1993 and UN .

leak variables, i.e. via the exogenous account multipliers, thus for the derivation of labour multipliers a similar formulae can be used.

The demand for regions' employment ($R\lambda$) is defined via a parameter $R\beta$ (regions' labour/output ratio)⁵ related to regions' activity output⁶, the $R\beta$ vector of fix-ratios represents the inverse of regions' sectoral average labour productivity and is in fact, albeit its simplicity, the regions' demand labour definition. If regional employment is defined as $R\lambda$ (t), the linking equation to the regions' labour satellite can be written as:

$$R\lambda_{(t)} = R\beta * RY_{(t)} = R\beta (RA * RY_{(t)} + RX_{(t)}) = R\beta \{(I - RA)^{-1} RX_{(t)}\} = R\beta * RM_a * RX_{(t)}$$

Where, $R\lambda$ is a vector of employment generation and $R\beta$ is the row vector (or matrix) of regions' labour/output ratios. It stands to logic that $R\beta$ by propagating the impact via RM_a into $R\lambda$ provides the link into the regions' satellite employment account and thus the β Ma matrix is the matrix or row vector of regional employment-output multipliers, which mathematically is analogous to the specification that defines the matrix exogenous multipliers, e.g. $RB \cdot RM_a$.

f. Aggregate IRSAM Regional Characteristics

Total income/expenditure (eliminating the intersection Rest of the World (RoW) with the itself (see **Error! Reference source not found.**) derived from the IRSAM shows that by far the most important region is Java & Bali (48.7%), followed by Sumatra (16.2%), Kalimantan (7.0%), Sulawesi (3.5%) and East Indonesia (3.0%). And employment regional distribution mimics the ranking and economic distribution; about 81% of all jobs are generated in the two regions, e.g. Java & Bali (58.2%) and Sumatra (21.1%). Note that there is a direct relation between employment and population. The most densely populated region is by far Java & Bali.

Table 1. 2005 IRSAM Total Income/Expenditure and External Sector Shares by Regions

External Sector	Sumatra	Java & Bali	Kalimantan	Sulawesi	East Indonesia	Other Accounts	Total
Total Income	16.2 %	48.7 %	7.0 %	3.5 %	3.0 %	21.6 %	100.0 %
RoW	9.3 %	26.8 %	5.5 %	2.1 %	2.3 %	54.1 %	100.0 %
Employment	21.2%	59.8%	6.8%	5.9%	6.4%		100.0%
Population (*)	21.31%	59.13%	5.8%	7.31%	6.46%		100.0%
Area (*)	25.43 %	6.75 %	25.43 %	10.14 %	27.32 %		95.07 %

Source: Authors own calculations (IRSAM_2005_DySAMValMacroModelCollapsed <Consol5RegIRSAM.); Population Source Census 2010

The Rest of World transactions (exports and imports) are also dominated by Java & Bali (26.8%) and Sumatra (9.3%), Kalimantan with (7.0%), East Indonesia and Sulawesi jointly with around 4.4%.

In order to enhance the understanding of inter-regional relations a brief assessment of the IRSAM regional table classified by the five mentioned regions is presented next.

The regional expenditure shares by main account (see Annex Table 12) show that in terms of the structure of total production (column PA = production activities) of Sumatra

⁵ Ideally there should a set of labour demands matching the types of labour factor's income classification shown in the SAM and the satellite show a matrix of labour/output ratios. However, most SAMs show only one type of labour income per economic activity hence is a row vector.

⁶ If data refers only to total employment per sector, as in the present case, then the ratio of employment per activity to total sector output (β) is a row vector of fixed ratios.

and Java & Bali account for a combined intermediate inputs purchases of 34.6% and the same is true for the combined factor income (FP) (40.8%), of which about two thirds correspond to Java & Bali. The factor income account (column FP) shows that the highest transfers to institutions originate Java & Bali (53.1%) and Sumatra (15.4%). The expenditures of institutions (IN) show that Java & Bali represents 41.1% of all household consumption and Sumatra with 11.1%. Such results contrast with those for the three other regions, showing shares between 5% and 1%.

Finally Table (see Annex) presents expenditures by regions and for the four main accounts showing accounts transacting within and across regions, e.g. block diagonal and off diagonal transactions indicate that for Sumatra and Kalimantan within region and institution consumption shares values, in the corresponding block diagonal and the off-diagonal IN-PA matrices, are lower than those for the other three regions. This is an indication that the two mentioned regions have a higher level of transactions with other regions, especially in terms of intermediate demand and associated factor and institutions incomes intra region transfers. From the economic point of view this implies larger leakages, i.e. in the form of income transfers and input and final goods purchases, from the poorer Sulawesi and East Indonesia regions to the two richest regions take place. The case of the oil rich Kalimantan region is different, it shows the highest remittances to the RoW, e. g. these are by main accounts FP remittances are 53.9%, IN remittances are 13.2% PA imports are 4.7%, which points out to a region with significant dependence from the RoW. The results shows abundantly clear that the two most economically dominant regions are Java & Bali and Sumatra and the poorer are of little economic importance and have negative flows in terms of net transfers to the richer regions and to the RoW.

1.4 Regional Employment and Decent Work (DW)

Indicators Satellites

Building a DW satellite, i.e. sectoral regional decent work profiles, was particularly complex and onerous because only total employment with multiple characteristics per region was provided. Therefore, many external sources and information from other countries were needed to build 38 indicators from one element and with multiple characteristics.

Deriving DW indicators was attempted considering the following five characteristics:

- Precarious work defined as work within Region and measured by casual work, e.g. people employed as either casual workers in agriculture or casual workers in non-agricultural sectors.
- Informal employment defined as informal employment within each region (development concept of a variable derived from Sakernas variable, generated by cross tabulation between two variables, namely employment status and main occupation.
- Employment by status in Indonesia and regions; classified by “self-employed”, “paid employees” and “un-paid workers”.
- Wages of casual/daily employed workers.
- Employed working 1-15 hours per week (total hours work)

After several attempts only the first three indicators could be meaningfully expanded. Consequently, a three dimensional DW satellite was built. A description of the derivation of the DW indicators is presented in the corresponding report Sec. 5.

2. IRSAM 2005 and Inter-Regional Model and Types of Regional Indicators

The results as portrayed in the analysis of the IRSAM model are reported below. The findings seem to be very revealing and can be used to understand interregional transactions and explain existing regional imbalances, and also the undertaking of simulations is made possible. An important consideration in this endeavour is related to the strategic infrastructure policy objectives and the implications to strengthen regional economic relations; hence, the construction sector had to be expanded⁷.

The IRSAM model and expansion methodology, results and interpretations were reported in the corresponding document⁸ thus only the most relevant aspects are presented in next sub-section.

2.1 IRSAM Regional Indicators and Cross Regional Backward Linkages

In Table 2 several types of inter-regional multipliers and backward linkages by region are presented and where each block measures the impact when an injection enters via each of the five regions.

Table 2. Indonesia Regional Partial and Cross Regional Backward Linkages (BK) by Main Account

Regional Level	Injection via Sumatra	Injection via Java & Bali	Injection via Kalimantan	Injection via Sulawesi	Injection via East Indonesia	Definition
Sumatra	Sumatra/ Sumatra	Java & Bali/ Sumatra	Kalimantan/ Sumatra	Sulawesi/ Sumatra	East Indonesia/Sumatra	Sumatra FP, IN, PA
Java & Bali	Sumatra/ Java & Bali	Java & Bali/ Java & Bali	Kalimantan/ Java & Bali	Sulawesi/ Java & Bali	East Indonesia/ Java & Bali	Java & Bali FP. IN. PA
Kalimantan	Sumatra/ Kalimantan	Java & Bali/ Sulawesi	Kalimantan/ Kalimantan	Sulawesi/ Kalimantan	East Indonesia /Kalimantan	Kalimantan FP, IN, PA
Sulawesi	Sumatra/ Sulawesi	Java & Bali/ Sumatra	Kalimantan/ Sulawesi	Sulawesi/ Sulawesi	East Indonesia /Sulawesi	Sulawesi FP, IN, PA
East Indonesia	Sumatra/ East Indonesia	Java & Bali/ East Indonesia	Kalimantan/ East Indonesia	Sulawesi/ East Indonesia	East Indonesia / East Indonesia	East Indonesia FP, IN, PA
Total Macro BK	Total Sumatra	Total Java & Bali	Total Kalimantan	Total Sulawesi	Total East Indonesia	All regions sum FP, IN, PA

One indicators is the total regional backward linkage (TRBrdLkg), this indicator is not used because is a very rough measure, i.e. it is plagued by double counting(s) and thus is not used here. The most important backward linkage indicator is the partial regional (PRBrdLkg), i.e. measured by the sum of the element in the main diagonal block and the

⁷ All previous BPS SAMs show the construction sector as one single aggregated sector, thus to perform meaningful simulations regarding regional infrastructure investments, which seem to be core of imbalances or at least a clue to try to redress them by the disaggregation or expansion of the construction sector.

⁸ See "ReportII_2008ExpdSAMSImulaFinal and DySAMTraining111223Final". See also the bibliography list.

next important indicator is the cross region backward linkage (CRBrdLkg) i.e. measured by the sum of the element in the off-diagonal blocks.

In the table, henceforth, the first column of linkages are for Sumatra, shows the partial (PRBrdLkg), or impact on itself is located in the block diagonal, note that block shows the main account (FP, PA and IN) consolidated and the second is the cross region (CRBrdLkg) or impact across the other four regions in each of the off-diagonal blocks. Similarly, each of the next four columns shows, correspondingly, for each region the same type of partial and cross impacts.⁹

2.2 IRSAM Cross Regional Correlations and Regional Potential Indicators

In the presentation of the expanded IRSAM model results, the analysis of backward linkages is limited to only Java & Bali and Sulawesi and the presentation of simulations results focuses on the impact analysis of the regional construction (infrastructure) scenarios.

In order to understand linkage relations, it is best to start by examining the two main accounts (FP and PA) inter-regional correlations, i.e. regional partial backward linkages and across regions.

In Table 3 the first column of the backward linkage correlations (upper panel) refers to Sumatra factor income (FP) with the FPs from all the other four regions and Sumatra backward linkage activity correlations (lower panel) with PAs from all other four regions. Similarly, the second column shows backward linkage correlation of Java & Bali with all other four regions, and so on.¹⁰

Table 3. Correlation Matrix by Region and Main Account

1-Factors of Production	Sumatra FP	Java & Bali FP	Kalimantan FP	Sulawesi FP	East Indonesia FP
FP Sumatra (Sum)	1	0.9076	0.9587	0.9944	0.9602
FP Java & Bali (JaBa)	0.3481	1	0.9744	0.9569	0.9922
FP Kalimantan (Kal)	0.4181	0.9873	1	0.9940	0.9909
FP Sulawesi (Sul)	0.4031	0.9778	0.9697	1	-0.8502
FP East Indonesia (EasInd)	0.3777	0.974626	0.9769	-0.1571	1
2-Production Activities	Sumatra PA	Java & Bali PA	Kalimantan PA	Sulawesi PA	East Indonesia PA
PA Sumatra (Sum)	1	-0.1485	0.6884	0.7635	0.7922
PA Java & Bali (JaBa)	0.5381	1	0.7523	0.6671	0.7506
PA Kalimantan (Kal)	0.1991	-0.1037	1	0.1598	0.3543
PA Sulawesi (Sul)	0.6440	0.4719	0.6895	1	0.2935
PA East Indonesia (EasInd)	0.5341	-0.1545	0.8016	0.3700	1

The interpretation is that the closer to unity the correlation between two regional linkages the highest probable impact conversely the lower the correlation the lower the

⁹ All the IRSAM model indicator definitions of the linkages and impact multipliers can found on "Glossary IRSAM Terms and Indicators".

¹⁰ Note that regional institutions correlations have not been calculated because there are only three institutions (observations) per region. From here onwards the references to sources of tables and graphs can be found in Table 12 in the Annex.

probability. FP regional correlations are found in the upper panel and PA regional correlation are found in the lower panel.

The first column in the upper panel indicates that if the Sumatra region receives an injection via FP the backward linkages correlation with Java & Bali FP is only 0.35 and with the other three regions the FP correlation varies between 0.38 and 0.42, an indication that factor incomes in the four regions may probably benefit mildly from such injection, if a all. By contrast, if the injection is made in the FP of either Java & Bali, Kalimantan, Sulawesi or East Indonesia (except for East Indonesia-Sulawesi and vice versa) all correlation levels are over 0.90, indicating that factor incomes in all regions will probably benefit from each other injections via FP. The explanation for the high relation has to do with the fact that when FP in either Java & Bali, Kalimantan, Sulawesi or East Indonesia receive an injection the resulting economic expansion in any of the four regions (via increased labour, capital and land income) will trigger consumption and in turn higher use of labour inputs, i.e. labour income and then household income increase and ultimately expenditures. The main conclusion is that the latter four regions are well integrated via transfers.

In the lower panel, where the Region's PA correlations are presented, the first column shows that if the Sumatra region receives an injection via PA, the correlations with the PA from other regions are low, they are between 0.2 and 0.65, an indication that the expansion of Sum production activities will probably not benefit from such an injection, i.e. intermediates needed to expand PA in Sumatra do not impact other regions significantly. More surprisingly, if the injection is made via Java & Bali PA most correlations are negative and below -0.1, except for Sulawesi, indicating that production activities on the other regions may probably have perverse impact, and it reflects, on the hand, the fact that the expansion of Java & Bali production does not require either inputs from the other regions as a result of low or no integration with the other regions, and on the other, income transfers from the four regions back into JaBa remain unaffected.

The other three regions show moderate-to-high probability, i.e. reflecting integration with the first three regions but between each other. More concretely, if either Sulawesi or East Indonesia receives the injection, both show very low probability (correlation) to impact each other (Kalimantan and East Indonesia) but with Sumatra and Java & Bali the probability (correlation) is moderate-to-high.

For economic activities it is very clear that an asymmetric relationship exists between the more developed regions and the less developed ones. The implications for growth policy suggest that promoting growth in the less developed regions will probably enhance growth mainly in the more developed regions, thus exacerbating the already lopsided inter-regional economic imbalances.

2.3 Java & Bali Activity Total, Partial and Cross Region Multipliers

The number of total, partial and cross backward and forward linkages for five regions and three main endogenous accounts is very large and as indicated before the presentation is limited to activity partial backward linkages for Java & Bali and Sulawesi and the activity cross backward linkages of Java & Bali with the other four regions and the same for Sulawesi. The account choice reflects the fact there are only three income institutions and factor income backward linkages distributions are flat and thus uninformative, the region's choice is related to the fact that the former is the most industrialized.

In Figure 1 partial and cross backward linkages for Java & Bali are presented. As expected the partial backward linkages are by far the most dominant impact. The range of the PRPABrdLkg varies from 3.0 to 6.3 and with an average of 4.8, thus narrowly spread.

The fact that the PRPABrdLkg is so high has to do with the fact that it includes the impacts of FP, PA and IN.

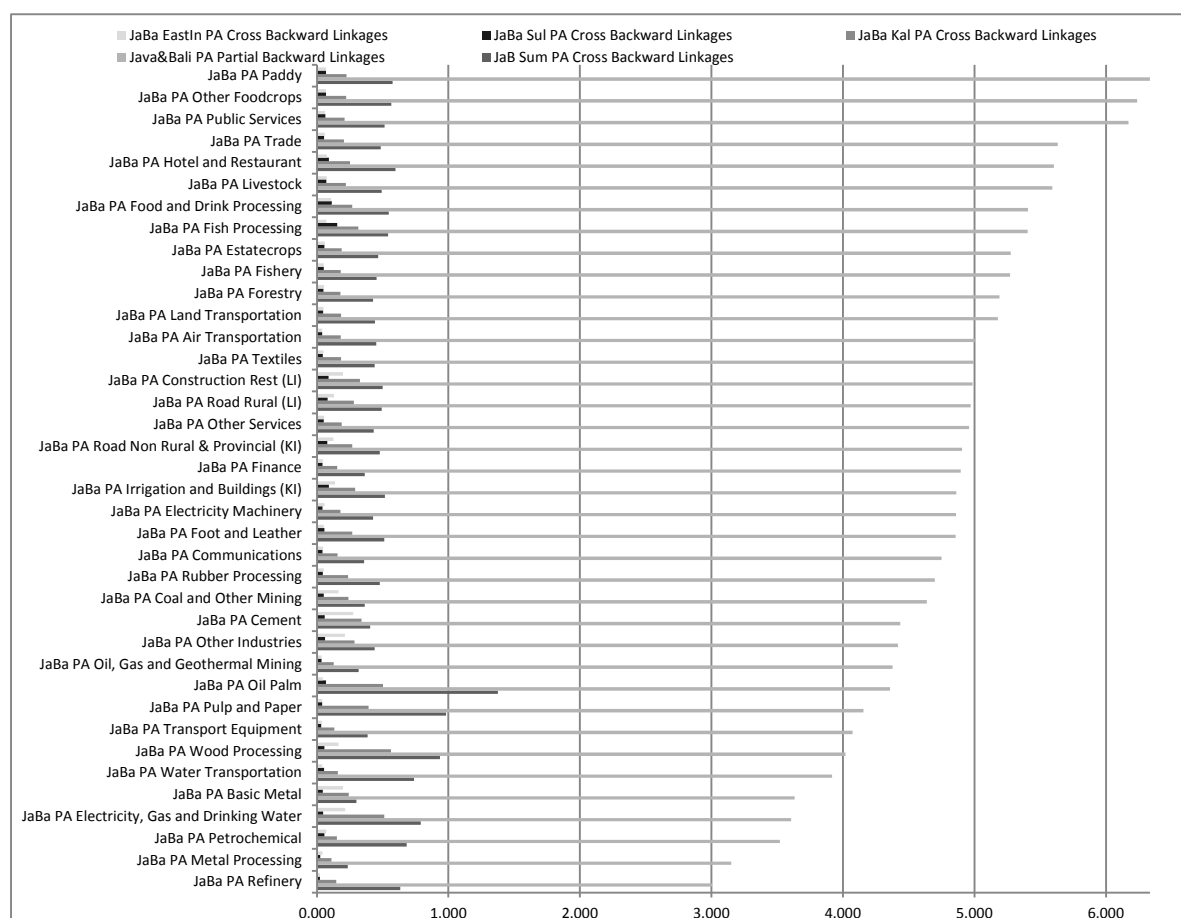
The figure further shows that at the top are mostly primary, consumption related, utilities, some service sectors and light industry, e.g. agriculture, food, services, hotel and restaurants, fish processing; while at the bottom are we find mostly capital intensive manufactures and services, e.g. refinery, metal processing, petrochemical, electricity-gas-drinking water, basic metal, water transport. A clear indication that the potential is not is the expansion of heavy industries, which are neither attractive for the expansion of employment, see below.

The interesting finding is that for Java & Bali the most important cross region impact is with Sumatra, especially at the lower end of the linkages. The range of CRPABrdLkg with Sumatra varies from 0.23 to 1.38 and averages 0.53, per million IDR.

The next CRPABrdLkg in importance for Java & Bali is Kalimantan and the least important are Sulawesi and East Indonesia. The CRPABrdLkg with Kalimantan varies from 0.11 to 0.56 (average is 0.25), with East Indonesia the range is 0.02 to 0.28 (average is 0.09) and finally with Sulawesi varies is from 0.02 to 0.14 (average is 0.09).

Interesting to note, as mentioned above, the cross regional correlation with three regions is negative and is moderately positive with Sulawesi, hence any expansion of the economic activity in Java & Bali probably increases moderately the output in Sulawesi albeit the impact is very low.

Figure 1. Java & Bali Economic Activity Partial and Cross Region Activity Backward Linkages



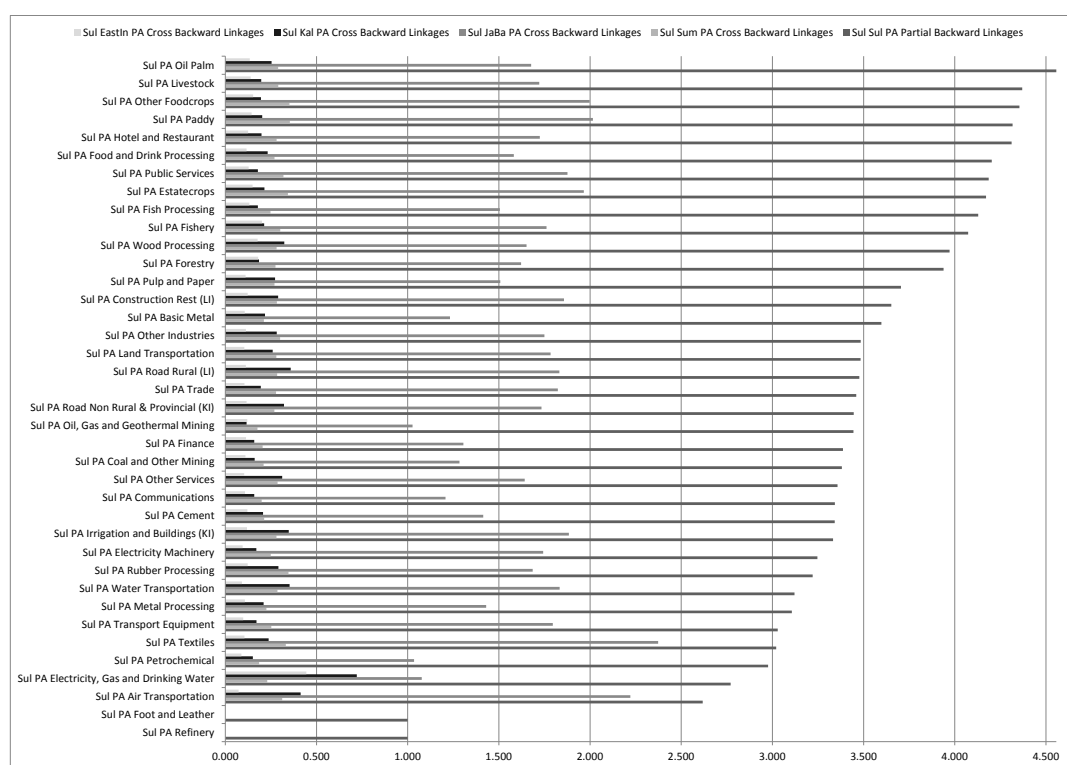
Source: see reference in Annex Table 12 sheet <RegBkgLkgTransPIRSAMModel2005>

In Figure 2 partial and cross backward linkages for Sulawesi are presented. As expected the partial backward linkages are by far the most dominant impact. The range of the PRPABrdLkg varies from 1.0 to 4.6 and with an average of 3.5, thus less narrowly spread than Java & Bali. The fact that the PRPABrdLkg is high has to do with the fact that it includes the impacts of FP, PA and IN.

Similarly to Java & Bali but with different sectors, the figure shows that at the top are mostly primary, consumption related, some service sectors and food processing industries, e.g. palm oil, food paddy, services, hotel and restaurants, fish processing; while at the bottom there is a mix of capital intensive manufactures labour intensive, utilities and services, e.g. refinery, foot and leather, textiles, petrochemical, electricity-gas-drinking water, basic metal, transport equipment. A clear indication that the potential is not is the expansion of capital intensive industries, which are neither attractive for the expansion of employment, see below.

The interesting finding is that for Sulawesi the most important cross region impact is with Java & Bali, the second economic most important region, and some sectors at the lower end show cross linkages that quite close to the partial linkage. The range of CRPABrdLkg with Java & Bali varies from 0.0 to 2.4 and averages 1.6, per million IDR.

Figure 2. Sulawesi Economic Activity Partial and Cross Region Activity Backward Linkages



Source: see reference in Annex Table sheet <RegBkgLkgTransplRSAMModel2005>

The next CRPABrdLkg in importance for Sulawesi are Sumatra and Kalimantan and the least important is East Indonesia. The CRPABrdLkg range with Sumatra varies from 0 to 0.34 (averages is 0.26), with Kalimantan varies from 0 to 0.72 (averages is 0.23), and finally with East Indonesia the range is 0.0 to 0.44 (average is 0.37). Notice that on the whole the ranges and impacts are higher than for Java & Bali, this implies that the expansion of Sulawesi will generate a reasonable expansion in the other regions. And this can be corroborated by the fact, as also mentioned above, that the cross regional correlation with all four regions are positive and are moderate to high with Sumatra and Java & Bali, hence any expansion of the economic activity in Sulawesi probably increases the output in the just mentioned sectors but the probability of impacting the other two is low to very low.

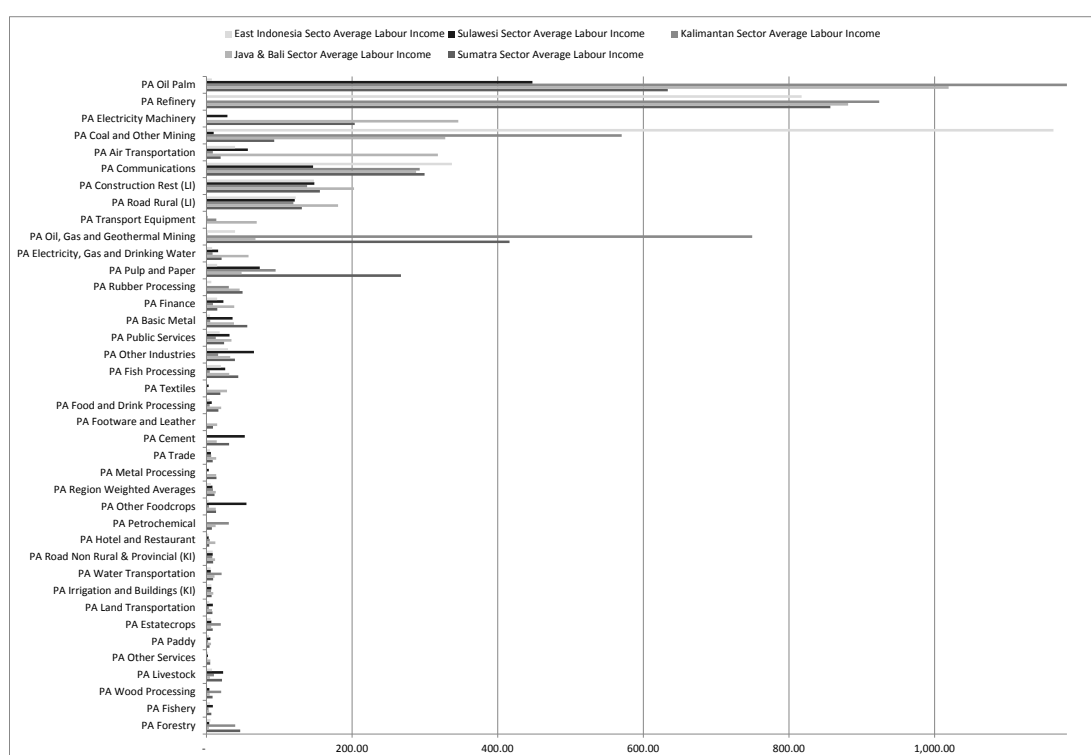
3. IRSAM 2005 Regional Employment Satellite: Labour Impact Indicators

3.1 Regional Average Sector Factor Labour Incomes

The stacked Figure 3 presents the average labour income out of labour (i.e. excl. capital and land income) for all five regions (ranking according to national average). The indicators are used as inputs in the derivation of the of the DW indicators and hence, it is important to understand the great cross regional and sectoral variations.

The two regions with the highest weighted AvgLY are Java & Bali and Sumatra with 12.8¹¹ and 11.1 million IDR annually, respectively, followed by Kalimantan, Sulawesi and East Indonesia with 9.0, 8.26.2 million IDR annually, respectively.

Figure 3. Economic Activity Average Labour Income by Region and Sector



Source see reference in Annex Table 12 sheet <DWIRSAM2005LabSatGraphs>

A closer look reveals that in Java & Bali and Sumatra the AvgLY of 24 out of 38 sectors show higher averages than their corresponding weighted average of 12.8 and 11.1 million IDR, respectively. Their overall range varies for Java & Bali from 3.5 (Forestry) to 1,019.3 (Oil Palm) and for Sumatra from 0.5 “Transport Equipment” to 856.8 (Refinery) million IDR. Notice that although the averages conceal sectoral distribution biases, the sectoral differentials provide an idea about the extent of distortion across and within regions, e.g. in Java & Bali Palm Oil employee earns annually 288 times the average factor income of an employee in forestry and in Sumatra a refinery employee earns 1758 times the average factor income of a transport equipment worker.

¹¹ In 2015 the exchange rate USD to IDR is 12,212, hence, the Java & Bali average of 12.8 million in today USD is 10,482 annually.

Kalimantan out of 34 sectors 19 have averages over its own average (9.0 Million IDR) and the range varies from 1.0 “Textiles” to almost 1,181.8 in “Oil Pal” million IDR annually and is the ratio is 1,157 times. Four sectors do not report output.

Sulawesi has 20 out of 36 sectors with average incomes over their respective own average (8.2 Million IDR) ranging from 0.5 (Petrochemicals) to 447.7 (Oil Pal) million IDR annually, e.g. the highest (Oil Pal) to lowest (Petrochemicals) ratio is close 867 times. Two sectors do not report output.

East Indonesia has 18 sectors over its own and average (6.2) and it ranges from 0.7 (Petrochemicals) to 1,163.2 (Coal and Other Mining) million IDR annually, e.g. the ratio almost 1,700 times.

On the whole not much can be said to describe sectors with averages over their own region average, except that the only pattern that can be identified is that those sectors tend to be capital intensive, enjoy high export demand, independently of whether they are primary, manufacture or services types.

Focusing on the two selected regions we find that, and as indicated above, there are 24 sectors with higher average in Java & Bali out of 38 and 20 out of 36¹² in Sulawesi, see Table 4. Further, the table shows that the sectoral AvgLY in the former are significantly higher than those in the latter, even for corresponding sectors.

The table also reveals that there is considerable overlap, 19 sectors are the same in both regions but the ranking loosely corresponds (see coloured green). On the whole, we find that for both regions sectors tend to be capital intensive, are urban based and provide massive services, but there are, especially in the poorer Sulawesi consumer good producing sectors and trade is absent, which reflects the fact that there are significant differences in the technology to produce the same commodity.

¹² Sulawesi does not have refinery nor food and leather industries.

Table 4. Java & Bali and Sulawesi Economic Activity Average Labour Income over Region Average

Java & Bali top 24 Economic Activities Average labour Income (million IDR)	Java & Bali Average Labour Income (Million IDR)	Sulawesi Top 20 Economic Activities Average labour Income (million IDR)	Sulawesi Average Labour Income (Million IDR)
PA Oil Palm	1,019.27	PA Oil Palm	447.66
PA Refinery	881.37	PA Construction Rest (LI)	148.26
PA Electricity Machinery	345.89	PA Communications	146.46
PA Coal and Other Mining	328.05	PA Road Rural (LI)	121.33
PA Air Transportation	317.87	PA Pulp and Paper	73.29
PA Communications	288.02	PA Other Industries	65.27
PA Construction Rest (LI)	202.62	PA Air Transportation	56.80
PA Road Rural (LI)	180.79	PA Other Food crops	54.96
PA Transport Equipment	69.03	PA Cement	52.61
PA Oil, Gas and Geothermal Mining	67.43	PA Basic Metal	35.89
PA Electricity, Gas and Drinking Water	57.88	PA Public Services	31.69
PA Pulp and Paper	48.25	PA Electricity Machinery	28.84
PA Rubber Processing	45.55	PA Fish Processing	25.83
PA Finance	38.25	PA Finance	23.39
PA Basic Metal	37.79	PA Livestock	22.94
PA Public Services	34.29	PA Electricity, Gas and Drinking Water	15.98
PA Other Industries	32.58	PA Coal and Other Mining	9.88
PA Fish Processing	31.30	PA Land Transportation	8.82
PA Textiles	28.29	PA Fishery	8.75
PA Food and Drink Processing	20.18	PA Road Non Rural & Provincial (KI)	8.67
PA Foot and Leather	14.66		
PA Cement	14.20		
PA Trade	13.41		
PA Metal Processing	13.37		

Source see reference in Annex Table 11 sheet <DWIRSAM2005LabSatGraphs>)

3.2 Regional Labour-Output Ratios (Lab/GVOR)

To derive the labour multipliers we need labour/output ratios¹³. In Figure, the ratios for all five regions are presented in decreasing order, ranked according to the Java & Bali. The ratios are the inverse of the average labour productivity, hence the higher the ratios the lower the labour productivity, e.g. top sectors show the lowest labour productivity.

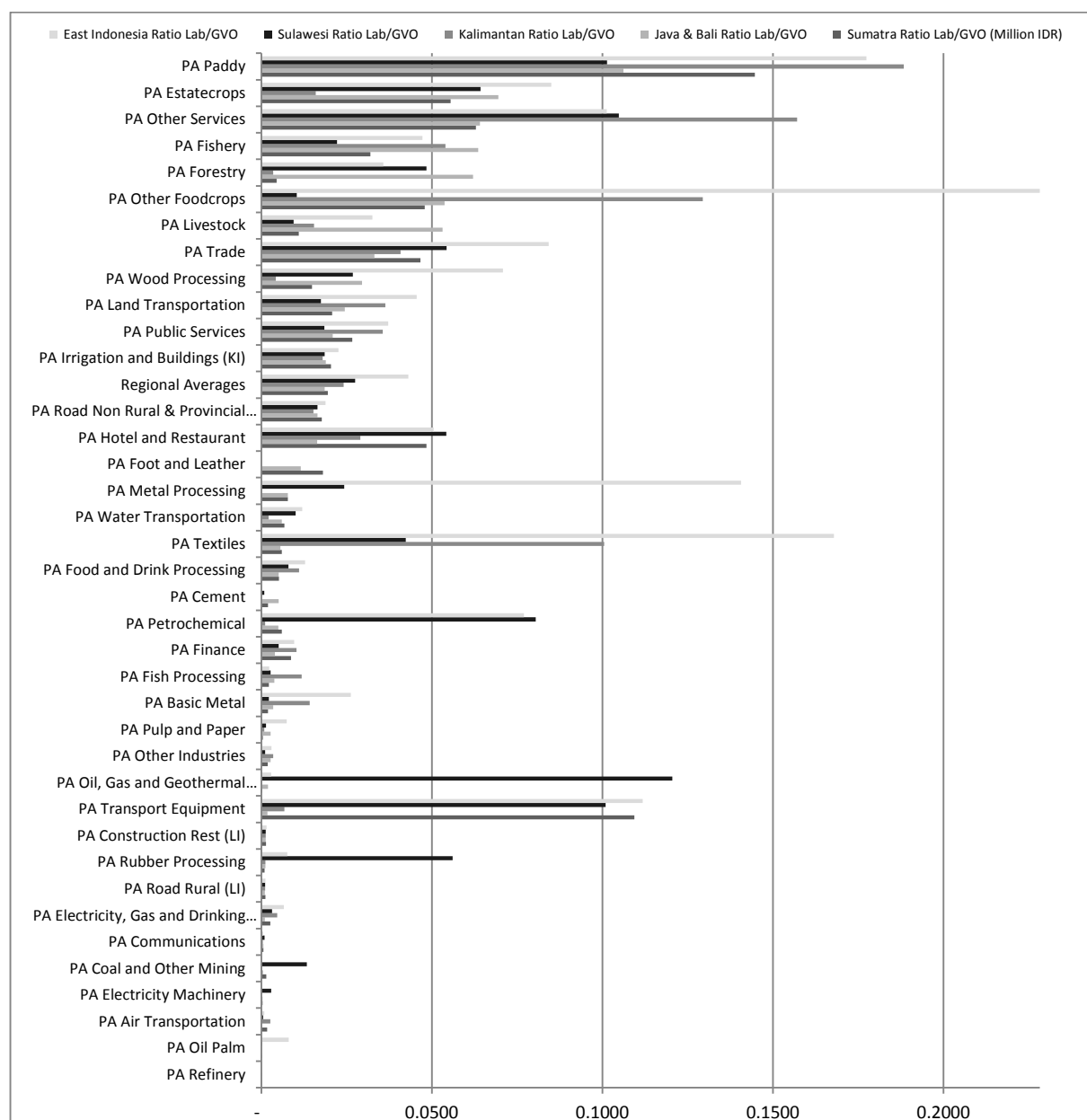
On the whole the ranking roughly is similar for all five regions and mostly the poorer regions of Kalimantan, Sulawesi and East Indonesia show the lowest labour productivity in the corresponding sectors. For the latter region “Other food crops” has between half and one tenth the labour productivity when compared to the other regions, similarly are “Paddy”, “Other Food crops”, Trade, “Wood processing”, “Metal processing”, “Textiles”, “Basic metal” and “Transport equipment”.

¹³ The labour satellite concepts and methodology can be found in ILO list of references presented as part of the bibliography.

For the two richer and for Kalimantan and East Indonesia their corresponding sector average labour productivity are not significantly different for most sectors.

On the whole not much can be said to describe sectors with averages below their own region average, except that the only pattern that can be identified is that manufactures that tend to be less labour and more capital intensive, modern services type and are not primary or agro-based.

Figure 4. Labour-Output Ratios by Region and Sector



Source see reference in Annex Table 12 sheet <DWIRSAM2005LabSatGraphs>

Results of the two selected regions show that sectors with lower than 26 in Java & Bali (average is 0.017) and 25 in Sulawesi (average is 0.028) show averages below their own average labour/GVO ratios¹⁴ and they roughly correspond in ranking, see table 5. Note that all Labour/GVO sector ratios are higher in Sulawesi; this implies that labour productivity is correspondingly lower as a result of technological differences.

14 Sulawesi appears not having refinery capacity neither foot and leather industries.

The table also reveals that there is an important overlap, 15 sectors are the same in both regions but the ranking loosely corresponds (see coloured green). On the whole, we find that for both regions sectors tend to be of the capital intensive type, are urban based and provide massive services, but there are, especially in the poorer Sulawesi consumer good producing sectors, which reflects the fact that there are significant differences in the technology to produce the same commodities.

Table 5. Java & Bali and Sulawesi Economic Activity Labour/Output Ratios below Region Average

Economic Activities Labour/GVO ratio (per million IRD)	Java & Bali Labour/GVO	Economic Activities Labour/GVO ratio (per million IRD)	Sulawesi Labour/GVO
PA Refinery	0.0001	PA Refinery	-
PA Oil Palm	0.0001	PA Foot and Leather	-
PA Air Transportation	0.0001	PA Oil Palm	0.0002
PA Electricity Machinery	0.0003	PA Air Transportation	0.0005
PA Coal and Other Mining	0.0005	PA Cement	0.0009
PA Communications	0.0006	PA Communications	0.0010
PA Electricity, Gas and Drinking Water	0.0010	PA Road Rural (LI)	0.0011
PA Road Rural (LI)	0.0011	PA Other Industries	0.0011
PA Rubber Processing	0.0012	PA Construction Rest (LI)	0.0013
PA Construction Rest (LI)	0.0013	PA Pulp and Paper	0.0014
PA Transport Equipment	0.0018	PA Basic Metal	0.0022
PA Oil, Gas and Geothermal Mining	0.0019	PA Fish Processing	0.0027
PA Other Industries	0.0027	PA Electricity Machinery	0.0029
PA Pulp and Paper	0.0027	PA Electricity, Gas and Drinking Water	0.0031
PA Basic Metal	0.0035	PA Finance	0.0050
PA Fish Processing	0.0038	PA Food and Drink Processing	0.0079
PA Finance	0.0039	PA Livestock	0.0095
PA Petrochemical	0.0050	PA Water Transportation	0.0100
PA Cement	0.0051	PA Other Foodcrops	0.0104
PA Food and Drink Processing	0.0051	PA Coal and Other Mining	0.0133
PA Textiles	0.0056	PA Road Non Rural & Provincial (KI)	0.0165
PA Water Transportation	0.0060	PA Land Transportation	0.0175
PA Metal Processing	0.0078	PA Public Services	0.0184
PA Foot and Leather	0.0115	PA Irrigation and Buildings (KI)	0.0186
PA Hotel and Restaurant	0.0164	PA Fishery	0.0222
PA Road Non Rural & Provincial (KI)	0.0164	PA Metal Processing	0.0243
Sumata Average Labout/Output Ratio	0.0169	PA Wood Processing	0.0268
PA Irrigation and Buildings (KI)	0.0189	Sumata Average Labout/Output Ratio	0.0280
PA Public Services	0.0209	PA Textiles	0.0424
PA Land Transportation	0.0245	PA Forestry	0.0484
PA Wood Processing	0.0295	PA Hotel and Restaurant	0.0543
PA Trade	0.0331	PA Trade	0.0543
PA Livestock	0.0531	PA Rubber Processing	0.0561
PA Other Foodcrops	0.0538	PA Estatecrops	0.0642
PA Forestry	0.0620	PA Petrochemical	0.0805
PA Fishery	0.0636	PA Transport Equipment	0.1009
PA Other Services	0.0641	PA Paddy	0.1013
PA Estatecrops	0.0695	PA Other Services	0.1048
PA Paddy	0.1061	PA Oil, Gas and Geothermal Mining	0.1205

Source see reference in Annex Table 12 sheet <DWIRSAM2005LabSatGraphs>

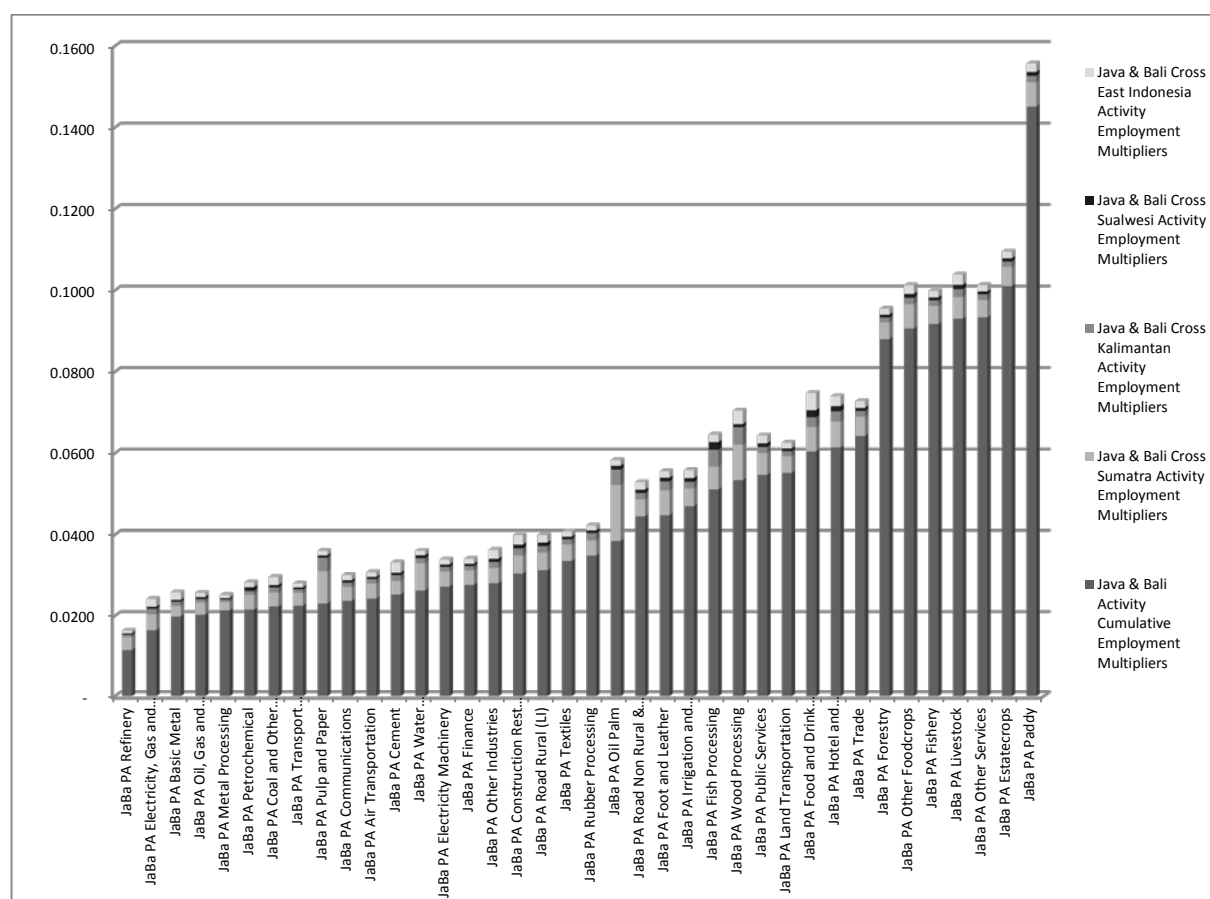
3.3 Java & Bali Cumulative and Cross Labour-Activity Linkages

Figure presents the cumulative labour activity multipliers for Java & Bali and its cross region effects with the other four regions. Multipliers are per million IDR injection.

As expected, and aside from the dominant cumulative effect, the figure shows that Java & Bali (JaBa) cross regional employment effects with Sulawesi are for almost sectors insignificant, whereas the cross with Sumatra and to a lesser extent with Kalimantan and East Indonesia are significant. The multipliers correlations of Java & Bali with all the four regions are positive but very low (0.14 to 0.4), implying that the expansion of JaBa may have a very low, if at all, employment impact on the poorer regions. The most important cross effect with Sumatra (JaBa Cross Sumatra) are in “Wood processing”, “Oil Palm” and “Pulp and paper”, the rest are not meaningful. The spread of the JaBa cumulative employment linkage is between 0.015 for “Refinery” and 0.15 for “Paddy”, the average is 0.05, indicating a very narrow range and a somewhat even distribution.

Among the top 15 we find all agriculture, food and processing food sectors and Paddy which are sectors that have the potential to create most jobs per injection in Java & Bali, e.g. 15 jobs for every 100 million IDR. The next six are very close in terms of impact with the potential to create between 8 and 10 jobs per 100 million IDR. Sumatra’s cross linkage with Java & Bali varies from 14% to 36%.

Figure 5. Java & Bali Cumulative and Cross Region Labour Activity linkages



Source see reference in Annex Table 12 sheet <DWIRSAM2005LabSatGraphs>

Among the bottom 20 we find all agriculture sectors and food, food processing and several manufacturing and extractive sectors, all showing the lowest potential to create jobs per injection, e.g. less than one job for every 100 million IDR.

3.4 Sulawesi Activity Cumulative and Cross Labour-Activity Linkages

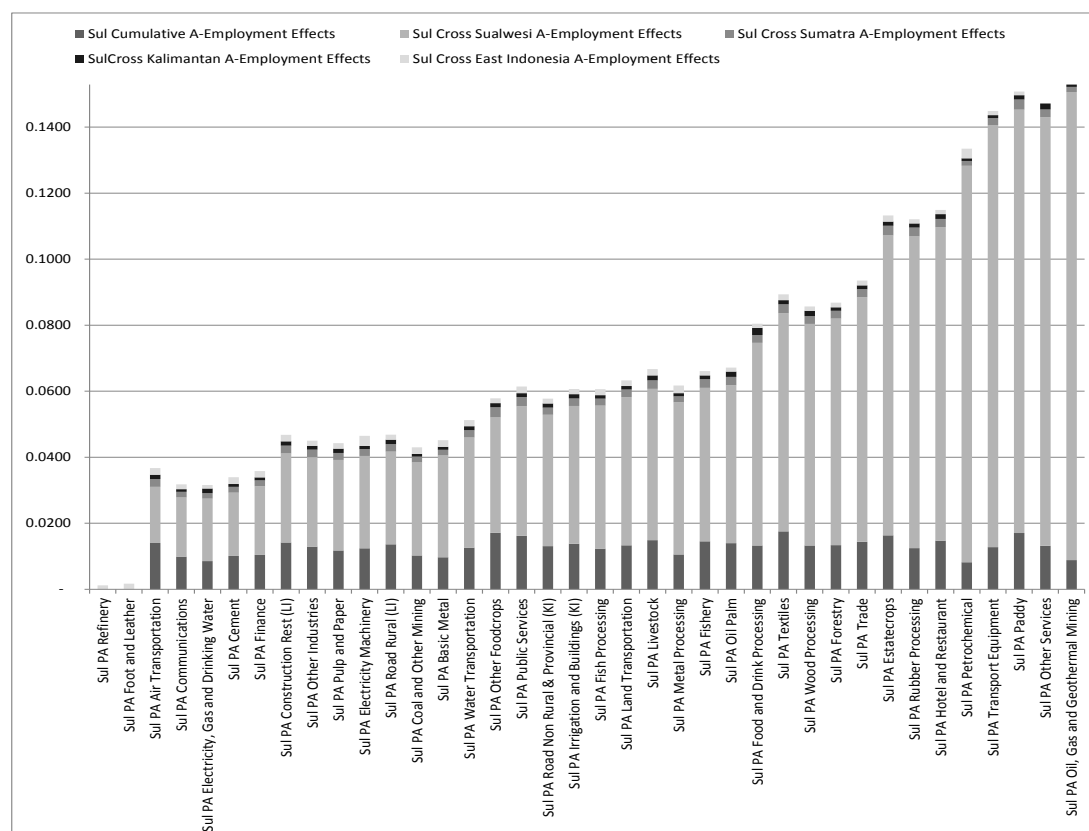
Figure 6 presents labour-activity linkages of Sulawesi region and with its cross linkages with the other four regions.

As expected the figure shows that throughout the cross regional linkages with Java & Bali are by far more significant than vice versa.

The linkage correlations of Sulawesi with three cross regions are positive but low (0.26 to 0.3) and with East Indonesia is negative. The overall implication is that the expansion of the region may probably impact employment in three regions in a rather close manner. The cross relation is with Java & Bali (red) is rather even, however as a share of the cumulative linkage the bottom 20 represents between 32% for “Livestock” 82% for Air Transportation”, this implies that the expansion of Sulawesi will greatly benefit employment in those sectors and the rest that are made up mainly of manufacturing construction and related industries, communication, basic, finance and public services. The spread of the cumulative employment linkages varies between 0.04 for “Air transport” and 0.14 for “Oil, Gas and Geothermal Mining”, the average is 0.06, indicating a very narrow range and a rather even distribution.

Among the top 15 we find a very significant mix of agriculture, food and processing food sectors. The top 5, e.g. “Oil, Gas and Geothermal Mining”, “Other Services”, “Paddy”, Transport Equipment” and “Petrochemical”, have the potential to create most jobs per injection in Sulawesi, e.g. between 12 and 14 jobs for every 100 million IDR, next two stand only to create less than 9 jobs. From the 14th impact are rather close and have the potential to create less than 4 jobs per 100 million IDR.

Figure 6. Sulawesi Cumulative and Cross Region Labour Activity linkages



Source see reference in Annex Table 12 sheet <DWIRSAM2005LabSatGraphs>

4. “Classic” Scenario Simulation and Implications for Strategic Policy

It is important to recall that two types of simulation can be performed when using SAM modelling methodology; one is labelled “classic” and other “structural”. The “classic” one refers to simulating changes in the values of the exogenous account entries, e.g. changing the level of fixed capital formation, subsidies, exports, etc., this is the type of simulation performed in this work. “Structural” simulations refer to altering the expenditure structures, e.g. production or consumption structures). The one-by-one period expansion method described elsewhere can be used for this type of simulation¹⁵. Also important to recall is that SAM is a static demand oriented model, hence, the simulation scenario measures only the impacts of investments as expenditures and not its productive impact. This is not to say that measuring the productive impacts of investments cannot be calculated using SAM, however, this requires extending the SAM model via the use of incremental capital/output ratios, since at this time we do not have these ratios the presentations is limited to expenditure impacts, i.e. short-term¹⁶ impacts measured before investments reach maturity.

The “classic” type infrastructure scenario developed here target all four construction sectors via the local government capital formation account and in each region. The targeting is simultaneous and assumes a 10% increase.¹⁷

The aim is to spur growth via an ad hoc policy scenario simulation that expands investments in all four construction sub-sectors and for each of the five regions. The assumption is that each local government wants to embark in furthering the construction of houses, buildings, infrastructures and supporting facilities within its own region by promoting additional 10% investments to its existing local capital formation. Further, the scenario assumes that the financing will be promoted using only local funding.

Five regional impacts have been calculated, together with their cross regional impacts as well as the combined impacts on all regions scenario. However, in this section only the impacts of infrastructure regional development on the two selected regions and their cross regional impacts, e.g. Java & Bali (JaBa) and Sulawesi (Sul), are presented.

To contextualize scenario results table 6 presents the local construction sectors of both regions. Note that total local construction activity is more thirty five times in JaBa than in Sul and at the national level the former accounts for 6% and the latter only 1%. In the IRSAM the within region distribution of sub construction sectors is identical for both regions.

Table 6. 2005 IRSAM Total Income/Expenditure and External Sector Shares by Regions

Target Local Government Capital Formation	Java Bali million IDR	Shares	Sulawesi million IDR	Shares
Road Rural (LI)	1,368,460	11%	3,884,488	17%
Road Non Rural & Provincial (KI)	2,548,450	20%	6,788,020	31%
Irrigation and Buildings (KI)	3,236,777	26%	8,161,974	40%
Construction Rest (LI)	1,040,685	8%	3,772,956	13%
Total Construction (Share in all regions Local FKF)	8,194,373 (6%)	100%	223,847 (1%)	100%

15 See DySAM reports presented among the bibliographic references.

16 Short-term, defined as the period when idle capacity prevails implies a period when no new investments are needed.

17 See (Source see reference in Annex Table 11; sheet < <DWIRSAM2005SceInfra>>.

4.1 Java & Bali Activity Simulation Infrastructure Impacts

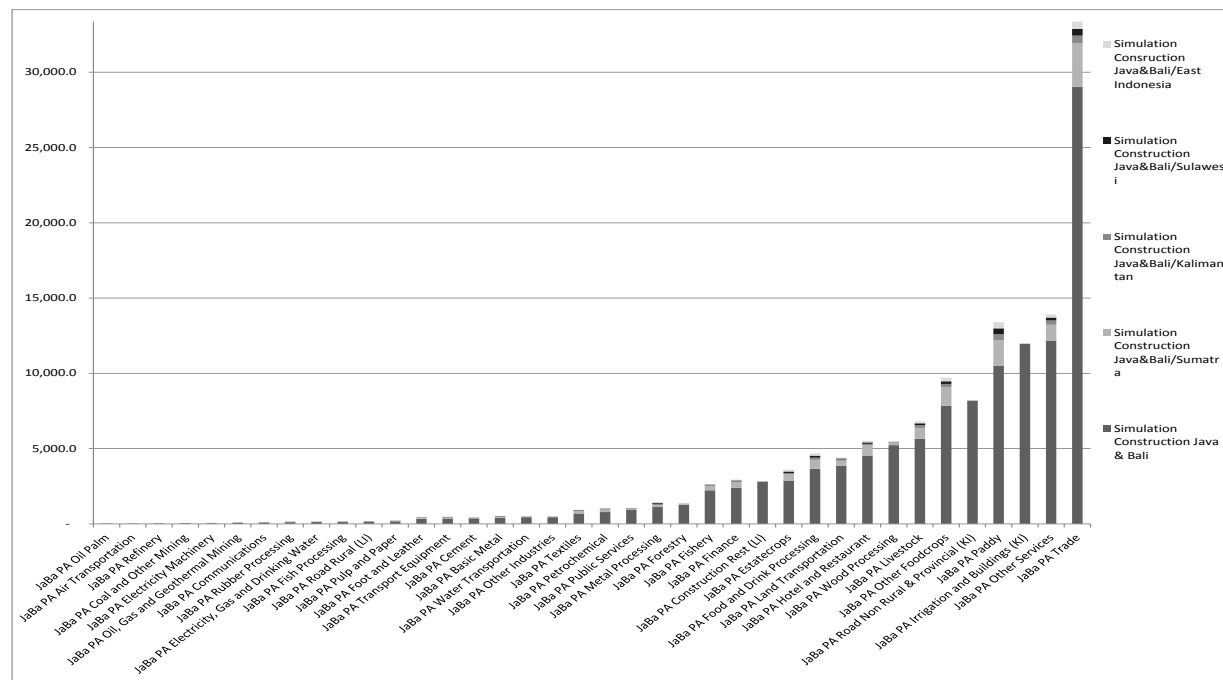
The next two figures present only the impact on own region activities and the cross account activity impacts. The impacts on JaBa are presented first.

Figure 7 shows that the greatest scenario impact is on “Trade” generating 33.4 billion IDR at the national level of which 29.0 billion IDR is in the JaBa sector itself. The only significant cross impacts is on the Sumatra (Sum) “Trade” sector, e.g. generating 2.9 billion IDR. The second sector in importance is “Other Services” and generates 13.2 billion at national level of which 12.1 billion IDR in the JaBa sector itself and 1.1 billion IDR in Sum sector.

Among the top 15 three of the targeted construction sectors, they are “irrigation” (3rd) generating almost 12.0, “Road non rural” (5th) generating 8.2 and “Construction Rest” (13th) generating 2.9 (all billion IDR). In line with the low level of construction cross regional interconnection all cross regional impacts are negligible. “Road Rural” is placed 28th. The rest of the top 15 group are two light manufacture, two service, five agro-livestock-fish and one transport sectors and none directly related to the expansion of construction.

After the top 15 sector regional impacts the impacts fall very rapidly, e.g. the bottom 21 sectors show impacts lower than 1 billion IDR and together they generate only 5.7 billion IDR. Among the bottom 15 sectors we find 4 heavy manufacture, 5 light manufacture, 2 service, 2 extractive, transport, construction, services and utilities.

Figure 7. Java & Bali Infrastructure Simulation and Cross-region Impacts



4.2 Sulawesi Activity Simulation Infrastructure Impacts

Figure shows that the ranking of results of Sulawesi are very different than for Java & Bali. The findings, unlike for Java & Bali, reveal that there is significant inter-sectoral links between the two regions, to the point that four sectors show cross impacts that are higher

than in the region itself. This finding serves to highlight the high degree of sectoral dependence of Sulawesi economy.

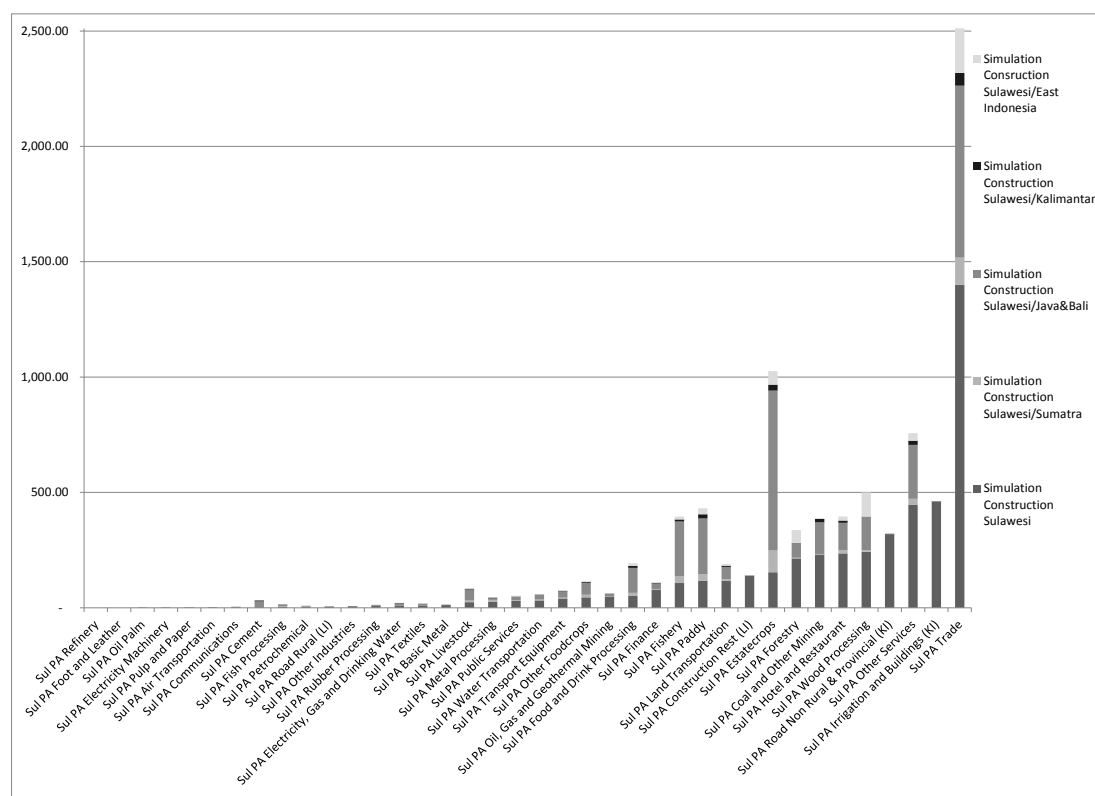
The largest scenario impact is again on Trade generating a total of 2.5 by of which in Sulawesi itself 1.4 (billion IDR). Further it shows significant cross impacts with Java & Bali 0.8, and much lower impacts with the other regions. The second sectors is “Irrigation and Buildings” and the third “Other Services”, generating 0.5 at national level of which 0.5 (all in billion IDR) in the region itself. For “Other Services” the national impacts is 0.8 of which 0.5 in Sulawesi itself and cross impact on Java & Bali is 0.2 (all in billion IDR). It is interesting to note that for 8 sectors cross impacts with Java & Bali are more than double the effect on itself, e.g. the two extreme cases are “cement” showing 9.3 times and “Estate crops” showing 4.5 times more effect.

Among the top 15 three of the targeted construction sectors (2nd, 4th and 10th), are found and they show only negligible cross regional impacts. Further “Road Rural” is in 28th place. Among the top 15 group we find several consumer goods, two light manufacture, three service and two extractive sectors, clearly most are not directly related to the expansion of construction. Note that after the 15 top the fall in total impacts is very sharp.¹⁸

The bottom 21 sectors show a combined total impact of around 6.3 billion IDR. Further the bottom 15 sectors are made up of heavy manufacture (4 sectors), light manufacture (6), transport, construction, agro-livestock, services and utilities.

Note that when comparing with the JaBa all Sulawesi impacts are much smaller throughout, demonstrating that the Java & Bali region is economically more powerful and benefits from Sulawesi expansion. The main reason is that Sulawesi transfers factor income and purchases household consumption and intermediate inputs for the Java & Bali region.

Figure 8. Sulawesi Infrastructure Simulation and Cross-region Impacts



Source see reference in Annex Table 11 sheet <ScenarioResultsGraphs>

¹⁸ In the region production of “Foot-Leather” and “Refinery” is absent.

5. Decent Work Indicators by Region, Gender, Region Comparisons and Results

5.1 Decent Work Criteria and Indicators

The regional decent work indicators in Indonesia presented here is considered a useful complement to the studies and applications that are limited to the national level.

For our purposes the general and specific definitions of decent work need to be matched with derived indicators, thus it was decided to follow ILO definition of precarious work in combination with informal employment as well as self-employed and unpaid work, as the main components in order to build a regional sectoral decent work profiles.

From the references about the components of sectoral DW the following three groups of indicators are considered:

1. General Indicators

- Degree of informal sector, classified by either family work, skilled and non-skilled and independent professionals
- Location Rural Urban
- Sector of work classified by primary, light or heavy manufacture or service
- Sector technology whether labour or capital intensive (criteria), green or brown jobs
- Vulnerability and/or income stability related to good contractual employment terms

2. Employment Derived Indicator

- Occupational level
- Sector of Occupation

3. Income Indicators

- Average income/wage
- Average informal labour income, total, male and female

Following the above listed criteria and at the national level the first two groups of indicators have been derived and used while from the third group only the average annual informal labour income (female and male) is used as DW indicator. The average labour income is used mainly to highlight regional/sectoral disparities¹⁹. Building the profiles using the above mentioned criteria allows determining the degree of sectoral employment vulnerability; hence the lowest degree indicates that the sector shows weak decent work characteristics while the reverse points out to sectors where labour is disadvantaged.

Concretely, since the data to build decent work indicator was available mainly at the aggregate regional level, only three types of sectoral regional indicators could be built.

¹⁹ See Sub-sec.3.1.

The criteria for the derivation of regional decent work indicators are supported by the ILO definition of decent work and can be described as follows:

- ✓ Precarious work: Precarious Work within each sector region is measured by casual work, e.g. people who are employed as either casual workers in agriculture or casual workers in non-agricultural sectors.
- ✓ Informal/formal employment: Informal Employment within each region uses a development concept applied to a variable derived from Sakernas survey. The variable was used to cross tabulate the following two variables, namely employment status and main occupation.
- ✓ Employment by status: Self-employment, paid and unpaid worker.

The criteria suggest that decent work sectors shows very low or no precarious work, low or no informal labour and very low or no un-paid work. The selected criteria are supported by the ILO definition of precarious work:

“Workers in precarious employment can either:

(a) be workers²⁰ whose contract of employment leads to the classification of the incumbent as belonging to the groups of “casual workers”, “short-term workers” or “seasonal workers”; or

(b) be workers whose contract of employment will allow the employing enterprise or person to terminate the contract at short notice and/or at will.

The common element among the precarious employment categories is the precarious, short-term nature of the employment contracts (category a) or their instability, as employers may terminate them upon short notice (category b).

Further, in order to build DW profiles for each of the three indicators the regions’ aggregates sectoral shares in total employment, total male and female employment are used. When deriving each of the shares care was taken to avoid violating reality checks and actual constraints, i.e. there must be a correspondence between factor income per sector and region and the corresponding employment and average factor income. Several rounds of iterations were undertaken and, after every round, the results of the very laborious method needed to be adjusted and then validated. The main aggregates can be found in the next table.

Table 7. List of Regional Parameters for the Derivation of Decent Work Indicators and Source

Regional and Aggregate Parameters for DW	Sumatra	Java & Bali	Kalimantan	Sulawesi	East Indonesia	Indonesia
Total Employment	19,997,617	56,467,037	6,390,105	5,538,677	6,081,072	94,474,509
Total Labour Income (excl. capital and land)	222,415,651.6	723,500,709.3	279,706,877.2	45,501,877.5	37,720,024.4	1,308,845,140.0
Value Added	571,575,060.3	1,556,778,182.6	287,161,119.7	104,785,022.0	95,967,858.3	2,616,267,242.9
Gross Value of Output (Million IDR)	1,092,952,744	3,350,666,111	493,641,506	197,913,753	160,567,846	5,295,741,960.0
Labour/Output Ratio	0.018	0.017	0.013	0.028	0.038	0.018
Average Labour Income (Million IDR)	11.12	12.81	8.95	8.22	6.2	11.5
Share of Labour Income in Total Value Added	38.9%	46.5%	19.9%	43.4%	39.3%	41.5%

²⁰ Workers under category (a) refer to the following: 1) Casual workers: contracts are not expected to continue for more than a very short period; 2) Seasonal workers: contract duration is influenced by seasonal factors such as climate, public holidays, agriculture season, etc. and 3) Short-term workers: contracts are expected to last for a short period, but longer than that of casual workers.

The list of the additional 11-33 parameters for each regional sector used to build the DW indicator and their macro weights can be found in the Annex Table 13. The table shows that slightly more than one third of the DW parameters are shares while the rest are absolute values. Indicators 11-13, 23-26 and 28-30 are used to derive the corresponding composite indicators. The graphs with all three indicators stacked by are presented and briefly analysed below.

5.2 Regional Decent Work Indicators

Since no a priori cut-off point(s) is available to benchmark and thus determine which are or are not DW sectors, it was decided to use the average of the “precarious work” indicator (composite of 11-13) as the DW cut-off point. Consequently, sectors with shares below the average can be considered as having DW characteristics on the average. Aside from the “precarious” composite index also “informal employment” and “self-employed-Unpaid worker” composite indicators have been derived. Composite indicator refers to the fact that each indicator includes several weighted elements, e.g. total, gender characteristics, summary of results and precarious work see Annex Table 13.

The figures showing the composite DW indicators for the five regions per sector are presented next. All figures are sorted from small to large using the “Precarious composite indicator”. Using as main reference and benchmark the “precarious composite indicator” indicates that sectors with values below the precarious cut-off point (average of the precarious composite work indicator) can be considered DW sectors, i.e. by definition workers are less vulnerable regarding employment conditions. Informal and status indicators show low relation with vulnerability and thus are shown only for comparison.

The figures portraying the three composite indices for each region are presented together with a short description of highlights.²¹ Note that the precarious employment composite index for each region is made up as follows.

The order of presentation follows the IRSAM order and note that the precarious employment composite index for each region is made up as follows:

- Shares of weighted precarious work within region total employment
- Male shares of weighted precarious work employment within region employment
- Female shares of weighted precarious work employment within region employment.

The informal employment composite index is made up as follows:

- Shares of total weighted informal employment within total region employment
- Male shares of weighted informal employment within region informal employment.
- Female shares of weighted informal employment within region informal employment.

The Employment by Status composite index is made up as follows:

- Shares Self - Employed
- Shares Paid Employees
- Shares Unpaid Workers

²¹ See Annex Regional DW Composite Indices: Precarious Work, Informal Employment figures 13 to 17.

5.3 Regional Decent Work Indicator Results

The following four figures can help to analyse the employment dimension of the economic sectors in all regions, including qualitative assessment. This is done for the three main DW sectoral indicators and for all five regions.

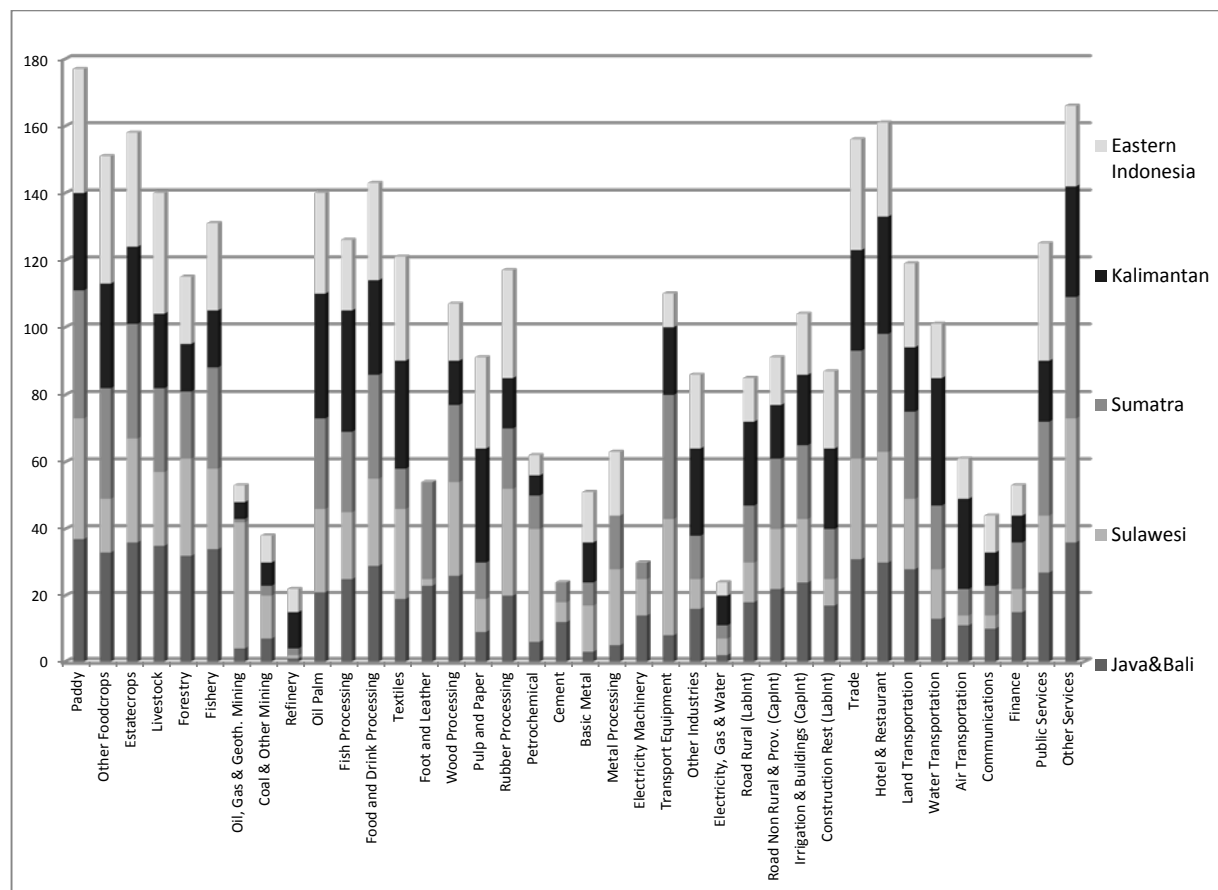
To prepare the information for each figure the following method was performed:

- The original indicators values derived from the IRSAM for each sector and each region are ranked from smallest to largest, from 1 to 38;
- A sector and for each province a value from 1 to 38 is assigned; and
- The corresponding values per sector for all five provinces are added such that each sector has one cumulative summed up (stacked) value, i.e. total possible is 190.

In this section four figures showing the stacked sectoral indicators are presented next together with a brief analysis of findings. Whereas the three sets of original DW indicators can be found in the Annex Sec. Tables where Composite Indicators with the Top 15 and Bottom 5 for Precarious Work, Backward Linkages, Cumulative Labour Multipliers and Scenario Results together with the scenario impacts for the two selected regions. Note that the stacked figures distinguish the contribution of each province in the total value of the indicator, thus that the higher the stacked value means the higher the potential of the overall cumulative labour multipliers, precarious work, informal and self- employment.

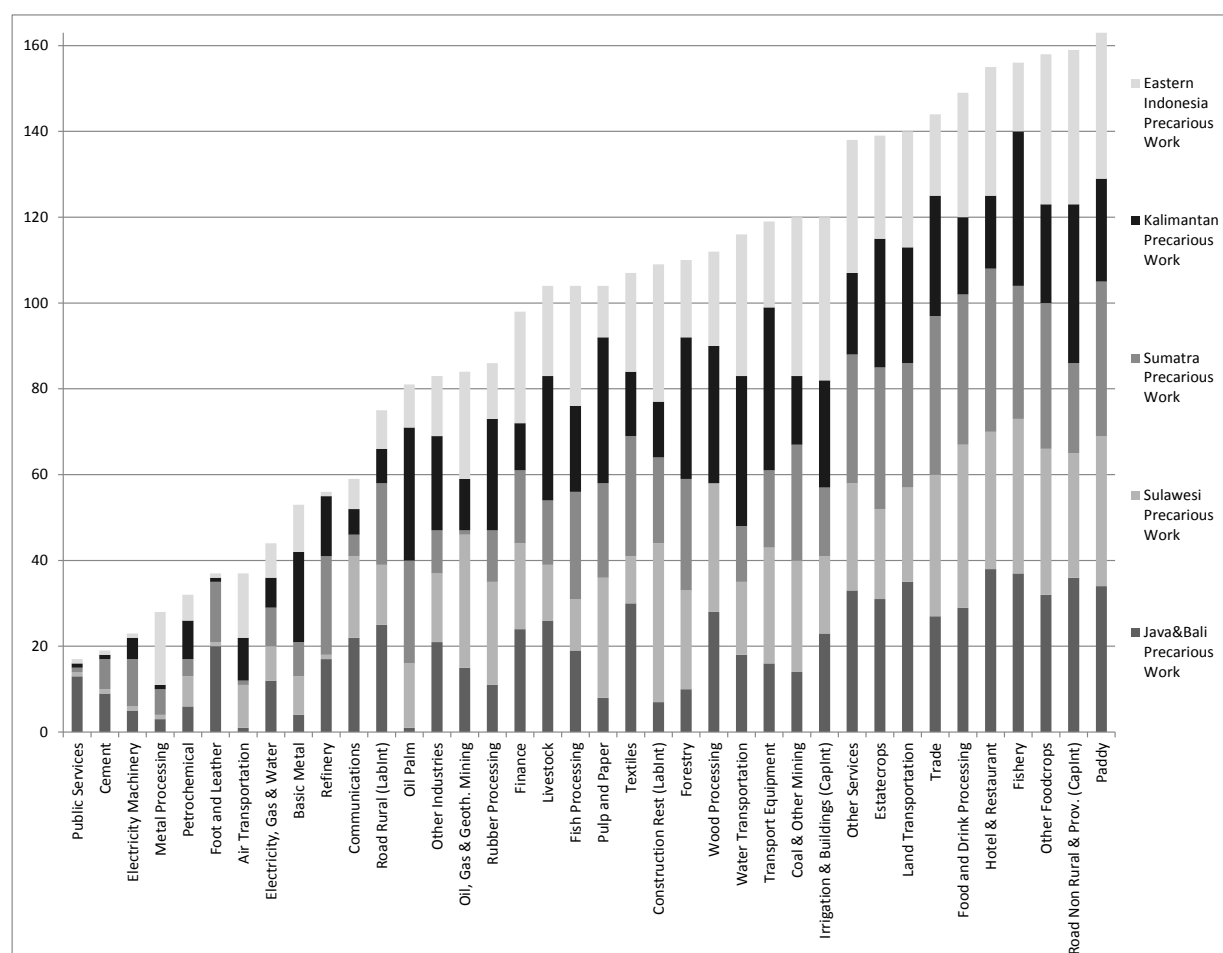
In Figure 9 presents a the summary of employment linkages showing that the highest stacked cumulative employment linkage can be found in agriculture (paddy, other food crops, estate crops) and in the service sectors, mostly trade, hotels & restaurants, but also other services. Light manufacturing, fish, food, wood and rubber processing, but also textile and transport equipment are also important potential employment generators. Regional differences, however, have to be taken into consideration. While textile shows similar results in all regions, transport equipment is only strong in Sulawesi and Sumatra. Refinery is mostly important in Kalimantan and petrochemical in Sulawesi.

Figure 9. Province Stacked Cumulative Employment linkages Indicators per Sector



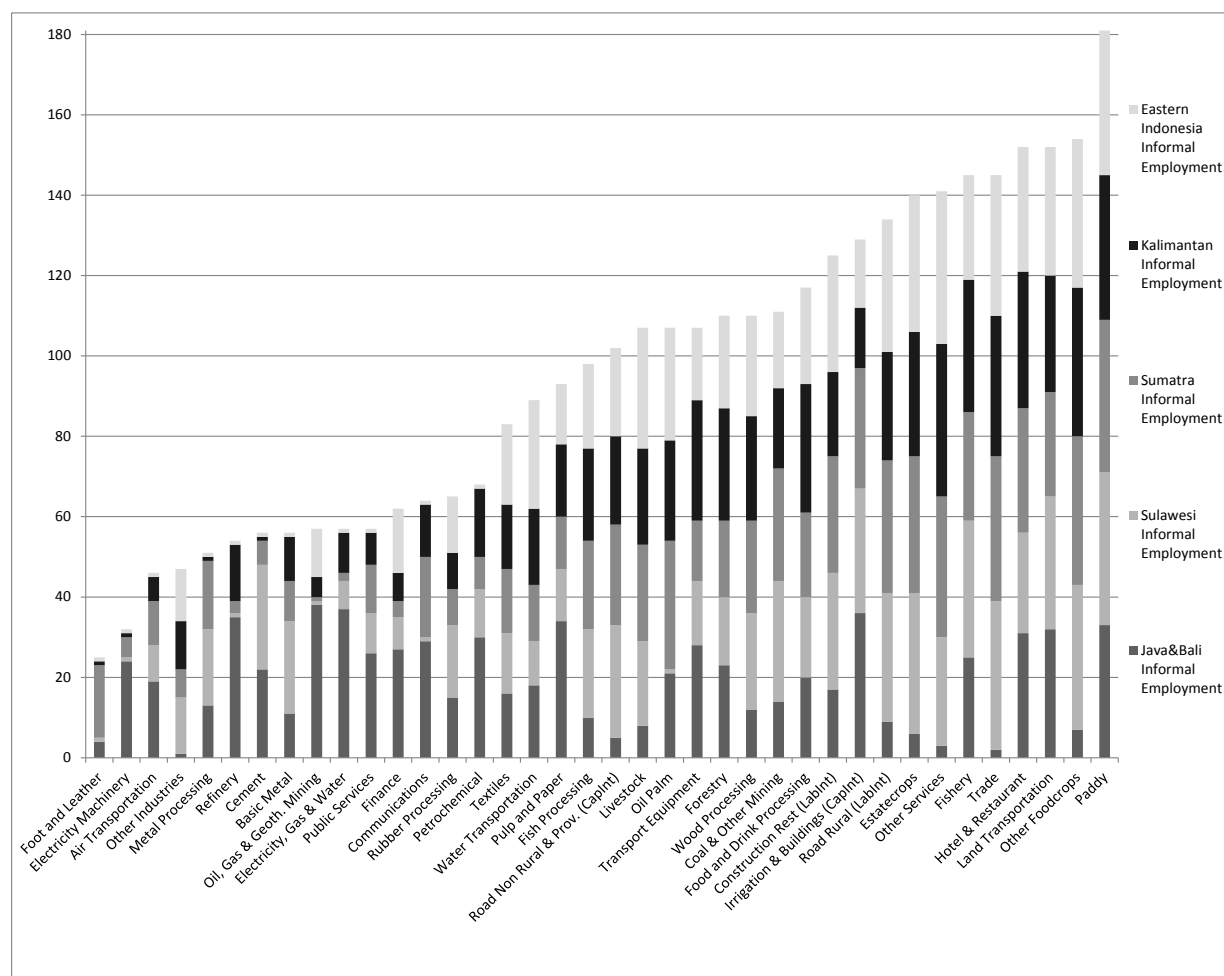
In Figure 10, a high level means that the sector show suffers of high levels of precarious work. Not surprisingly some “high level” services such as public services, air transportation or communication, and more sophisticated industrial services (petrochemical, electricity machinery, metal processing, but also foot and leather and cement) are among those considered as having the lowest level of precarious work, while typically agriculture, fishery and low level services such as trade, hotels and restaurants, land transportation and other services are among those not meeting Decent Work characteristics. There are again slight differences among provinces, which may also be explained by the importance or lack of importance of specific sectors in specific provinces. In Kalimantan, basic metal is much more precarious work than in the other provinces, whereas communication is much less so. Sumatra, however, has a relatively high share of precarious work in electricity machinery and in foot and leather (similar to Java & Bali), compared with the other regions, while it has relatively little precarious work in communication.

Figure 10. Stacked Province Precarious Work Indicators per Sector



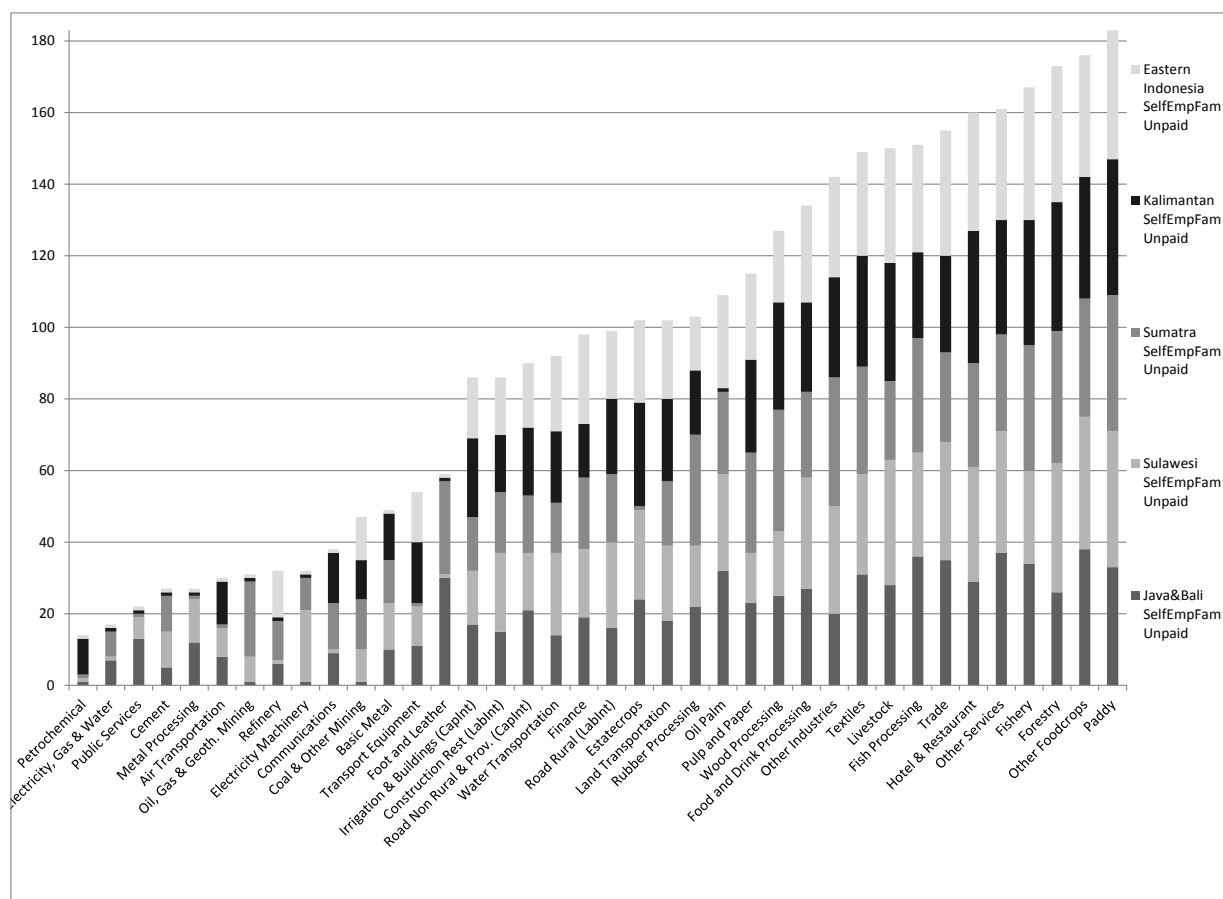
According to Figure 11, sectors with the highest level of informal employment have the highest values. Not surprisingly, some agricultural products, low level services, but also the construction sectors can be found among the sectors with the highest level of informal employment. On the other side of the spectrum, you can find many manufacturing sectors, with the lowest level for foot and leather, followed by electricity machinery, but also higher level services such as air transportation and public services. The differences between the provinces are more striking regarding informal employment compared to the two other indicators. While Java&Bali have high level of informal employment in electricity machines and electricity, gas & water, Sumatra has high level of informal employment in foot and leather.

Figure 11. Stacked Provinces Informal Employment Indicators per Sector



In Figure 12 another category showing low level of Decent Work is the Index on the self-employed and unpaid family workers. The results are more mixed, even though it confirms the before shown trend. Most agriculture sectors have high values, such as simple services like trade, hotels or other services, but also other industries. By nature, sectors like petrochemical, electricity, public services, but also cement, refinery, coal and oil do not have a high level of self-employment and unpaid family workers. These activities are normally done by big enterprises or institutions. It is interesting to notice the relatively higher value on oil, coal and electricity in Sumatra as well as the relatively high level of electricity machinery in Sulawesi.

Figure 12: Stacked Provinces Self-employed and Unpaid family worker Indicators per Sector



5.4 Summary Precarious Work Averages for National, Regions and Gender

In the next table, where the national and regions shares of precarious work by gender are presented, it can help us to see the relative region vulnerability, i.e. assessed by comparing the national total employment precarious average sectoral shares with the corresponding for each show.

The table shows that for four regions show non-vulnerability whereas Java & Bali does not, i.e. their corresponding total average precarious share of national average. It can also be seen that the poorer the region the lower the vulnerability. The findings in terms of male vulnerability show that the 3 poorer regions are non-vulnerable show while in terms of female vulnerability only the two poorest regions have averages below the national average share.

Table 8. Precarious Work Averages National, Regions and Gender

Shares of Averages of Precarious Work in National and by Region in Total and regional employment	National Share of Sector Average	Sumatra Share of Sector Average	Java & Bali Share of Sector Average	Kalimantan Share of Sector Average	Sulawesi Share of Sector Average	East Indonesia Share of Sector Average
Total and Region Share Average Precarious Work	10.59%	7.77%	13.40%	5.41%	3.64%	5.63%
Male Average Precarious Work National and by Region	5.02%	6.01%	9.85%	4.79%	3.28%	6.12%
Female Average Precarious Work National and by Region	5.57%	10.72%	19.28%	6.49%	4.24%	5.01%

Sources can be found in Annex Table 12

6. Decent Work Tentative Conclusions and Recommendations

A posteriori is important to remember that the basic information that allowed deriving the DW composite relative indicators were generated after researching comparative cases and were further supplemented with reality check controls and several iteration rounds to validate them, hence, they formally should be considered as placeholders. Notwithstanding, the results, on the whole, portray regions and sectors as expected, clearly the comparative regional findings and within and across regions outliers need to be further researched and explained. Hence, the main recommendation is to revise them and try to find ways to improve the accuracy of each of the composite indicators.

The main conclusion that can be derived is that there is a partial and justifiable relation in terms of the level of economic development. Concretely in terms of the level of the precarious work, see Table 9, using that annual average labour income (excl. capital and land income) as a proxy economic achievement, we can see that the range of variation for Kalimantan (the highest average income) is the widest; the upper limit is also the highest and has the larger number of DW sectors, but alas the composite average indicator is the highest (0.076). The next two high incomes regions (Sumatra and Java & Bali) show narrower ranges than Kalimantan, and while Sumatra has the largest number of DW sectors Java & Bali (the richest) has the lowest of all regions, further, the average composite indicator puts them down in third and fourth place. East Indonesia and Sulawesi, with two lowest average incomes, have the narrowest ranges and the lowest upper limit; further, they show that two thirds of the sectors exhibit DW characteristics and the average composite indices are the lowest.

Table 9. Summary Decent Work “Precarious Work” Composite Indicators by Region

Region	Range DW	Average DW	No. DW Sectors	Zero values	Annual Average Labour Income (million IDR)
Sumatra	0 to 0.182	0.031	26	3	424.83 (2 nd)
Java & Bali	0 to 0.208	0.059	15	2	417.79 (3 rd)
Kalimantan	0 to 0.441	0.076	26	5	775.50 (1 st)
Sulawesi	0 to 0.083	0.013	24	6	112.21 (5 th)
East Indonesia	0 to 0.151	0.029	24	5	219.65 (4 th)

The findings seem to point out to greater within region disparities in terms of labour vulnerability and the existence of larger pockets of labour vulnerability associated with higher income regions and vice versa, which may reflect poor income distribution within the richer regions. The result may be explained by the well-known economic migrant phenomena, i.e. the highest income regions attract continuous labour migration of disproportionately poorer groups from lower income regions, and these migrants invariably land jobs with the highest vulnerability.

Clearly the results seem indicate that sectors with higher capital intensity, whether manufacturing (machinery, chemicals) or extractive (mining) and more up-to-date technology (oil extraction and refining) are among those with higher DW characteristics (lowest average composite indicators). Whereas most service sectors (trade, hotels, restaurants), light manufacturing, agro-based (food processing and textiles), on the whole, fare poorly in terms of DW characteristics; results which are mostly in line with what we expected about these sectors. It begs the question about the degree of successfully implemented DW policies against sectoral economic deterministic characteristics, i.e. capital intensity, outdated/non modern technologies, scale, large domestic and external markets, etc.

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Annex Tables and Graphs

Table 10. Expenditure Shares by Regions and Main Macro Accounts: Second Level Disaggregation

Shares By Regions	Macro PA	Macro FP	Macro IN	Local TxSInv	K Account	IN Indirect Taxes	IN Subsidies	IN Central Government	Rest of The World	Total Income
Sumatra FP	10.96%				0.00%	0.00%	0.00%	0.00%	0.14%	4.26%
Sumatra IN		15.43%	2.09%	0.50%	0.00%	0.00%	0.00%	13.08%	0.37%	3.73%
Sumatra PA	9.61%		11.14%	15.66%	13.18%	0.00%	0.00%	3.04%	8.80%	8.01%
Sumatra TxSInv	0.00%				4.14%	0.00%	0.00%	0.00%	0.00%	0.22%
Java & Bali FP	29.84%				0.00%	0.00%	0.00%	0.00%	0.37%	11.60%
Java & Bali IN		53.11%	5.35%	1.54%	0.00%	0.00%	0.00%	23.40%	0.64%	11.96%
Java & Bali PA	24.97%		41.14%	59.28%	49.92%	0.00%	0.00%	10.59%	25.74%	24.65%
Java & Bali TxSInv	0.05%				8.92%	0.00%	0.00%	0.00%	0.00%	0.50%
Kalimantan FP	5.50%				0.00%	0.00%	0.00%	0.00%	0.09%	2.14%
Kalimantan IN		5.00%	1.03%	0.27%	0.00%	0.00%	0.00%	5.42%	0.14%	1.30%
Kalimantan PA	4.47%		2.96%	10.83%	4.05%	0.00%	0.00%	1.24%	5.23%	3.39%
Kalimantan TxSInv	0.01%				2.79%	0.00%	0.00%	0.00%	0.00%	0.15%
Sulawesi FP	2.01%				0.00%	0.00%	0.00%	0.00%	0.02%	0.78%
Sulawesi IN		3.68%	1.38%	0.14%	0.00%	0.00%	0.00%	4.79%	0.08%	1.09%
Sulawesi PA	1.43%		2.07%	8.04%	2.49%	0.00%	0.00%	0.60%	1.99%	1.47%
Sulawesi TxSInv	0.00%				2.58%	0.00%	0.00%	0.00%	0.00%	0.14%
EastIndo FP	1.84%				0.00%	0.00%	0.00%	0.00%	0.02%	0.72%
EastIndo IN		3.09%	0.95%	0.20%	0.00%	0.00%	0.00%	5.24%	0.15%	0.91%
EastIndo PA	1.21%		1.42%	3.56%	1.86%	0.00%	0.00%	0.53%	2.13%	1.19%
EastIndo TxSInv	0.01%		0.00%		3.27%	0.00%	0.00%	0.00%	0.00%	0.18%
K IN Local Gov.			4.32%		0.00%	0.00%	0.00%	0.00%	-4.72%	0.17%
K IN Central Gov.					0.00%	0.00%	0.00%	29.57%	-1.19%	0.45%
K IN Private			8.53%		0.00%	0.00%	0.00%	0.00%	22.79%	4.77%
IN Indirect Taxes	2.16%				0.00%	0.00%	0.00%	0.00%	0.83%	0.95%
IN Subsidies	-1.59%	0.00%	0.00%		0.00%	0.00%	0.00%	0.00%	0.00%	-0.61%
IN Central Gov.	0.00%	0.35%	3.31%		0.00%	100.00%	100.00%	1.86%	7.20%	2.07%
Rest of the World	7.51%	19.35%	14.31%		6.79%	0.00%	0.00%	0.63%	29.18%	13.80%
Total Expenditures	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.0%

Table 11. Expenditure Shares by Regions and Main Regional Accounts: Third Level Disaggregation

Regions 1 and 2	Region 1				Region 2			
Regions and Main Accounts	Sumatra FP	Sumatra IN	Sumatra PA	Sumatra TxSInv	Java & Bali FP	Java & Bali IN	Java & Bali PA	Java & Bali TxSInv
Sumatra FP	0.00%	0.00%	52.96%	0.00%	0.00%	0.00%	0.00%	0.00%
Sumatra IN	68.64%	7.75%	0.00%	2.63%	0.67%	0.89%	0.00%	0.00%
Sumatra PA	0.00%	44.33%	34.80%	45.44%	0.00%	3.41%	3.34%	6.59%
Sumatra TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Java & Bali FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	46.84%	0.00%
Java & Bali IN	2.86%	1.80%	0.00%	0.00%	87.71%	7.88%	0.00%	3.70%
Java & Bali PA	0.00%	15.51%	6.20%	50.08%	0.00%	55.12%	35.86%	82.68%
Java & Bali TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.07%	0.00%
Kalimantan FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Kalimantan IN	0.57%	0.02%	0.00%	0.00%	0.34%	0.20%	0.00%	0.00%
Kalimantan PA	0.00%	0.88%	0.76%	1.85%	0.00%	1.87%	2.24%	3.31%
Kalimantan TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sulawesi FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sulawesi IN	0.03%	0.01%	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%
Sulawesi PA	0.00%	0.11%	0.06%	0.00%	0.00%	0.36%	0.32%	1.61%
Sulawesi TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EastIndo FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EastIndo IN	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
EastIndo PA	0.00%	0.07%	0.04%	0.00%	0.00%	0.36%	0.77%	2.11%
EastIndo TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
K IN Local Gov.	0.00%	6.82%	0.00%	0.00%	0.00%	2.97%	0.00%	0.00%
K IN Central Gov.	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
K IN Private	0.00%	7.76%	0.00%	0.00%	0.00%	7.96%	0.00%	0.00%
IN Indirect Taxes	0.00%	0.00%	1.95%	0.00%	0.00%	0.00%	2.33%	0.00%
IN Subsidies	0.00%	0.00%	-1.27%	0.00%	0.00%	0.00%	-0.94%	0.00%
IN Central Gov.	0.36%	3.67%	0.00%	0.00%	0.34%	2.60%	0.00%	0.00%
Rest of The World	27.54%	11.27%	4.51%	0.00%	10.92%	16.36%	9.16%	0.00%
Total Expenditure	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Regions 3 and 4	Region 3				Region 4			
With all five regions	Kalimantan FP	Kalimantan IN	Kalimantan PA	Kalimantan TxSInv	Sulawesi FP	Sulawesi IN	Sulawesi PA	Sulawesi TxSInv
Sumatra FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sumatra IN	0.27%	0.01%	0.00%	0.00%	0.00%	0.11%	0.00%	0.00%
Sumatra PA	0.00%	1.40%	3.24%	6.08%	0.00%	1.53%	0.04%	13.27%
Sumatra TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Java & Bali FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Java & Bali IN	2.70%	0.08%	0.00%	0.00%	0.06%	0.59%	0.00%	0.00%
Java & Bali PA	0.00%	20.52%	3.67%	27.37%	0.00%	19.91%	8.20%	20.38%
Java & Bali TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Kalimantan FP	0.00%	0.00%	62.87%	0.00%	0.00%	0.00%	0.00%	0.00%
Kalimantan IN	42.34%	12.24%	0.00%	2.10%	0.51%	0.96%	0.00%	0.00%
Kalimantan PA	0.00%	22.40%	31.50%	64.26%	0.00%	0.57%	2.77%	4.22%
Kalimantan TxSInv	0.00%	0.00%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%
Sulawesi FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	52.99%	0.00%
Sulawesi IN	0.28%	0.00%	0.00%	0.00%	90.58%	15.74%	0.00%	1.17%
Sulawesi PA	0.00%	0.33%	0.18%	0.02%	0.00%	30.96%	30.68%	60.80%
Sulawesi TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.11%	0.00%
East Indonesia FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
East Indonesia IN	0.00%	0.01%	0.00%	0.00%	1.24%	3.90%	0.00%	0.00%
East Indonesia PA	0.00%	0.12%	0.04%	0.19%	0.00%	0.54%	0.34%	0.15%
East Indone. TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
K IN Local Government	0.00%	8.17%	0.00%	0.00%	0.00%	6.56%	0.00%	0.00%
K IN Central Government	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
K IN Private	0.00%	12.34%	0.00%	0.00%	0.00%	8.78%	0.00%	0.00%
IN Indirect Taxes	0.00%	0.00%	1.76%	0.00%	0.00%	0.00%	1.45%	0.00%
IN Subsidies	0.00%	0.00%	-8.07%	0.00%	0.00%	0.00%	-0.08%	0.00%
IN Central Government	0.46%	9.21%	0.00%	0.00%	0.26%	2.72%	0.00%	0.00%
Rest of The World	53.95%	13.18%	4.72%	0.00%	7.35%	7.14%	3.51%	0.00%
Total Expenditure	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Continuation Table 11

Region 5 with all five regions	Region 5				Other Acc K							All Five Regions
Sulawesi TxSInv	East Indo FP	East Indo IN	East Indo PA	East Indo TxSInv	K IN Local Government	K IN Central Government	K IN Private	IN Indirect Taxes	IN Subsidies	IN Central Government	Rest of The World	Total Income
Sumatra FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	0.14%	4.26%
Sumatra IN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	13.08%	0.37%	3.73%
Sumatra PA	0.00%	2.05%	0.07%	12.90%	26.99%	11.50%	12.85%	0.00%	0.00%	3.04%	8.80%	8.01%
Sumatra TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	7.50%	3.97%	0.00%	0.00%	0.00%	0.00%	0.22%
Java & Bali FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	0.37%	11.60%
Java & Bali IN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	23.40%	0.64%	11.96%
Java & Bali PA	0.00%	17.57%	7.07%	63.75%	55.13%	41.80%	50.5%	0.00%	0.00%	10.59%	25.74%	24.65%
Java & Bali TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	0.27%	10.05%	0.00%	0.00%	0.00%	0.00%	0.50%
Kalimantan FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	0.09%	2.14%
Kalimantan IN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	5.42%	0.14%	1.30%
Kalimantan PA	0.00%	0.98%	0.77%	2.69%	7.60%	4.75%	3.86%	0.00%	0.00%	1.24%	5.23%	3.39%
Kalimantan TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	2.46%	2.92%	0.00%	0.00%	0.00%	0.00%	0.15%
Sulawesi FP	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	0.02%	0.78%
Sulawesi IN	0.22%	9.89%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	4.79%	0.08%	1.09%
Sulawesi PA	0.00%	0.39%	1.37%	1.58%	2.36%	1.14%	2.63%	0.00%	0.00%	0.60%	1.99%	1.47%
Sulawesi TxSInv	0.00%	0.00%	0.00%	0.00%	0.00%	3.01%	2.63%	0.00%	0.00%	0.00%	0.00%	0.14%
East Indonesia FP	0.00%	0.00%	60.03%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	0.02%	0.72%
East Indonesia IN	82.88%	15.06%	0.00%	1.32%	0.00%	0.00%	0.0%	0.00%	0.00%	5.24%	0.15%	0.91%
East Indonesai PA	0.00%	23.68%	22.57%	17.76%	4.08%	4.29%	1.56%	0.00%	0.00%	0.53%	2.13%	1.19%
East Indon. TxSInv	0.00%	0.00%	0.20%	0.00%	0.00%	1.19%	3.58%	0.00%	0.00%	0.00%	0.00%	0.18%
K IN Local Gov.	0.00%	3.51%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	-4.72%	0.17%
K IN Central Gov.	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	29.57%	-1.19%	0.45%
K IN Private	0.00%	13.38%	0.00%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	22.79%	4.77%
IN Indirect Taxes	0.00%	0.00%	2.15%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	0.83%	0.95%
IN Subsidies	0.00%	0.00%	-0.45%	0.00%	0.00%	0.00%	0.0%	0.00%	0.00%	0.00%	0.00%	-0.61%
IN Central Gov.	0.32%	3.37%	0.00%	0.00%	0.00%	0.00%	0.0%	100.0%	100.0%	1.86%	7.20%	2.07%
Rest of The World	16.57%	10.13%	6.21%	0.00%	3.85%	22.08%	5.46%	0.00%	0.00%	0.63%	29.18%	13.80%
Total Expenditure	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 12. Inter-regional SAM Indonesia 2005: Source Excel, Worksheets and DW Indicators

Source Excel File: I IRSAM2005_ConsExtModelPilotDW2013SimulEmplEmi_Final)	
Inter-regional SAM Indonesia 2005	Readme
Worksheets	Description
IndicComparPPT	DW summary tables with indicators for reports and PPT presentations
SummaryDWMaLMaSim	Summary DW indicators tables: Ma, Labour multipliers, BkwdLkg, Simulaiton results
ScenarioEcoResultsGraphs	Economy Scenario results and graphs
DWIndicIRSAM2005LabMultScen	
DWIndicatorsIRSAM2005	Decent Work Indicators by Region, Ranked and Graphs
DWProfilesIRSAMExpndI2005	Final IRSAM for modelling and where the basis DW indicators is placed
DWIRSAM2005LabSatGraphs	Labour satellite for modelling and DW
DWIRSAMExpndModel2005	IRSAM model indicators
DWIRSAM2005ScenInfraLabMultGraph	IRSAM model indicators and Scenario Economy and Labour
ScenarioLaboResultsGraphs	
RegBkgLkgTranspIRSAMModel2005	

Table 13. List of Decent Work Indicators

Precarious work Within Region (measured by casual work, means people who are employed as either casual workers in agriculture or casual workers in non-agricultural sectors) Weight for Precarious Decent Work Indicator (source: Readme the order as in Readme)	Shares
11- Shares Precarious work Within Region (measured by casual work, means people who are employed as either casual workers in agriculture or casual workers in non-agricultural sectors) Weight Total Precarious Decent Work Indicator	0.33
12- Male Shares Precarious work employment In Total Regional Employment: measured by casual work, means people who are employed as either casual workers in agriculture or casual workers in non agricultural sectors. Weight Male Precarious Decent Work Indicator	0.33
13- Female Shares 2005 Precarious work in Total Regional Employment: measured by casual work, means people who are employed as either casual workers in agriculture or casual workers in non-agricultural sectors. Weight Female Precarious Decent Work Indicator	0.34
14- Precarious work Within Region (measured by casual work, means people who are employed as either casual workers in agriculture or casual workers in non-agricultural sectors) (Share in total Employment 10.3%)	9,758,195
15- Male Precarious work employment In Total Regional Employment: measured by casual work, means people who are employed as either casual workers in agriculture or casual workers in non-agricultural sectors. (Share in total Employment 4.9%)	4,629,815
16- Female 2005 Precarious work in Total Regional Employment: measured by casual work, means people who are employed as either casual workers in agriculture or casual workers in non-agricultural sectors. (Share in total Employment 5.4%)	5,128,380
Informal Employment within each Region (development concept of variable which derives from Sakernas variable, that produce by cross tabulation between two variables, namely employment status and main occupation).	
17- Shares of Informal Employment within each Region (development concept of variable which derives from Sakernas variables, that produce by cross tabulation between two variables, namely employment status and main occupation).	0.25
18- Male Shares Informal employment In Total Regional Employment: development concept of variable which derives from Sakernas variable, that produce by cross tabulation between two variables, namely employment status and main occupation.	0.25
19- Female Shares Informal employment In Total Regional Employment: development concept of variable which derives from Sakernas variable, that produce by cross tabulation between two variables, namely employment status and main occupation.	0.25
20- Informal Employment within each Region (development concept of variable which derives from Sakernas variable, that produce by cross tabulation between two variables, namely employment status and main occupation). (Share in Tot Emp. 52.6%)	49,690,926
21- Male Informal employment In Total Regional Employment: development concept of variable which derives from Sakernas variable, that produce by cross tabulation between two variables, namely employment status and main occupation. (Share in Tot Emp. 29.9%)	28,223,004
22- Female Informal employment in Total Regional Employment: development concept of variable which derives from Sakernas variable that produce by cross tabulation between two variables, namely employment status and main occupation. (Share in Tot Emp. 22.7%)	21,464,632
23- Total Informal income Thousand IDR	0.25
24- Average Annual Informal Labour Income Thousand IDR	0.25
25- Average Annual Total Factor Labour Income Thousand IDR	0.25
26- Ratio Avg Annual Informal/Total Factor Income	0.25
27- Female Non-informal employment in Total Regional Employment: development concept of variable which derives from Sakernas survey variable that produced cross tabulation between two variables, namely employment status and main occupation.	
CHK Ratio Average Informal Factor Labour Income to Formal Factor Labour Income	
Share number of employment by Self - Employed, Paid and Unpaid employees status by Region, shares derived using the 2007 as basis	
28- 2005 Shares Self - Employed, shares derived using the 2007 as basis (Weight Total Self-Employment Decent Work Indicator)	0.33
29- 2005 Shares Paid Employees, shares derived using the 2007 as basis (Weight Total Paid Employees Decent Work Indicator)	0.33
30- 2005 Shares Unpaid Workers, shares derived using the 2007 as basis (Weight Total Unpaid Workers Decent Work Indicator)	0.34
2005 Self - Employed, Paid and Unpaid employees	Persons
31- 2005 Self – Employed (share in total Employment 50.4%)	47,633,282
32- 2005 Paid Employees (share in total Employment 37.8%)	35,712,440
33- 2005 Unpaid Workers (share in total Employment 11.8%)	11,128,787

Notice that slightly more than one third of the DW parameters are shares while the rest are absolute values. Indicators 11-13, 23-26 and 28-30 are used to derive the corresponding composite indicators. The graphs with all three indicators, sorted out using the “precarious work” composite indicator, are presented and briefly analysed below.

Regional DW Composite Indices: Precarious Work, Informal Employment, Work Status

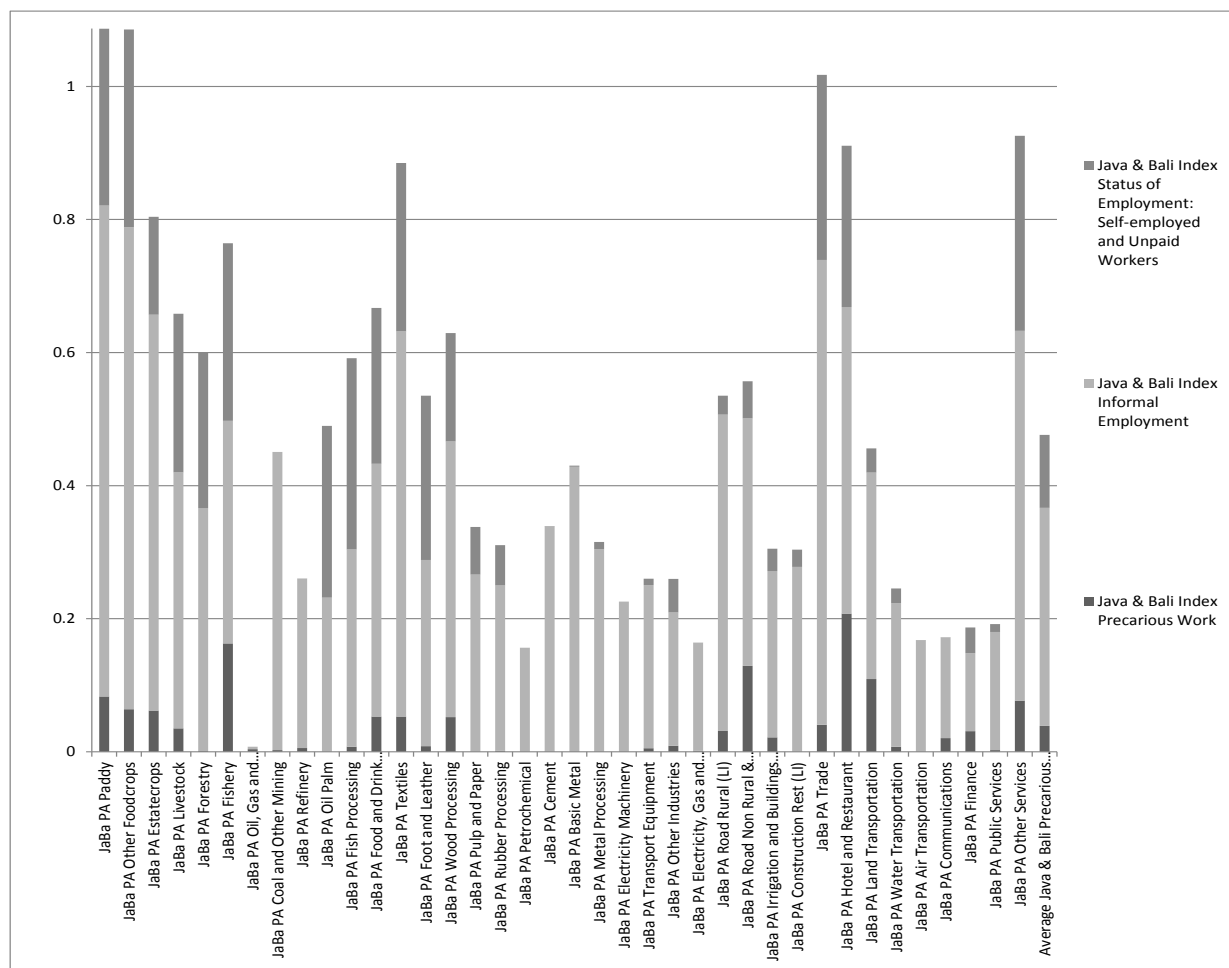
Java & Bali DW Composite Indices

Figure 13 shows that for Java & Bali the precarious composite indicator varies from 0 to 0.208, with an average value of 0.039. There are 15 DW sectors with an average of 0.001, while the 23 non-DW sectors vary from 0.005 to 0.208 with an average of 0.056.

The figure also shows that there is a very low association between the precarious work composite indicator and the informal composite indicator (correlation 0.44) as well as with the status composite indicators (correlation 0.46), whereas there is a moderate association between the last two indicators (correlation 0.63).

Not surprisingly, in the most prosperous region, all oil and related activities, air transport, construction (labour intensive) and related activities, heavy/light manufacturing, utility sectors and a few service sector are among those considered as having DW characteristics, while typically trade, hotels, light manufacturing, construction (capital intensive) agriculture based and primary sectors are among those not meeting DW characteristics.

Figure 13. Java & Bali DW Composite Indices: Precarious Work, Informal Employment, Work Status



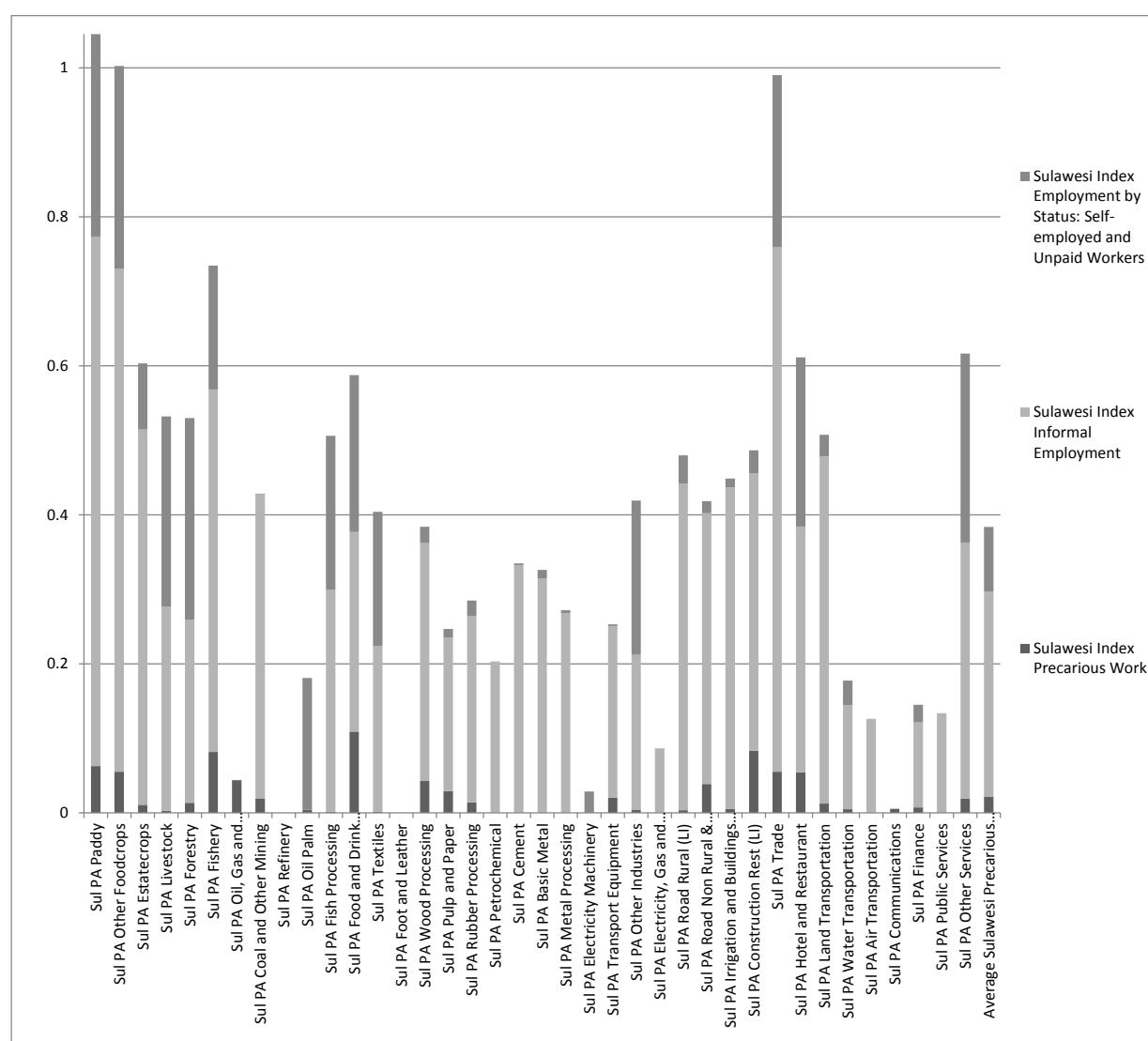
Sulawesi DW Composite Indices

Figure 14 shows that for Sulawesi the precarious composite indicator varies from 0 to 0.083, with an average value of 0.013. There are 24 DW sectors with an average of 0.003, while the 14 non-DW sectors vary from 0.014 to 0.083 with an average of 0.029.

The figure also shows that there is no association of the informal (correlation 0.33) and of the status composite indicators (correlation 0.16) with the precarious work composite indicator. Further there is a very low association between the last two indicators (correlation 0.45).

In this region public services, oil and related activities, air transport, construction (labour intensive) and related activities, heavy/light manufacturing, utility sectors and a few service sectors are among those considered as having DW characteristics, while typically trade, hotels, light manufacturing, construction (capital intensive) agriculture based and primary sectors are among those not meeting DW characteristics.

Figure 14. Sulawesi DW Composite Indices: Precarious Work, Informal Employment, Work Status



Sumatra DW Composite Indices

For Sumatra the “precarious composite” indicator varies from 0 to 0.182, with an average value of 0.031. There are 26 DW sectors over their own average (average is 0.008), while the 12 non-DW precarious sectors index vary from 0.037 to 0.182 with an average of 0.079.

From the results it can be inferred that there is a very low association with the informal composite indicator (correlation 0.65) and much less with status composite indicators (correlation 0.49) with the precarious work composite indicator. The correlation between the last two indicators is even weaker (correlation 0.37).

Not surprisingly all oil, construction related and heavy/light manufacturing, utility sectors and a few service sector are among those considered as having DW characteristics, while typically trade, hotels, light manufacturing, agriculture based and primary sectors are among those not meeting DW characteristics.

Kalimantan DW Composite Indices

For Kalimantan the precarious composite indicator varies from 0 to 0.441, with an average value of 0.076. There are 26 DW sectors with an average of 0.023, while the 12 non-DW sectors vary from 0.081 to 0.441 with an average of 0.193.

From the results also shows that there is no association of the informal (correlation 0.29) and of the status composite indicators (correlation 0.2) with the precarious work composite indicator, whereas there is a significant association between the last two indicators (correlation 0.7).

Characteristically for the region, public services, oil and related activities, air transport, construction (labour intensive) and related activities, heavy/light manufacturing, utility sectors and a few service sector are among those considered as having DW characteristics, while typically trade, hotels, light manufacturing, construction (capital intensive) agriculture based and primary sectors are among those not meeting DW characteristics.

East Indonesia DW Composite Indices

For East Indonesia the precarious composite indicator varies from 0 to 0.108, with an average value of 0.151. There are 24 DW sectors with an average of 0.029, while the 14 non-DW sectors vary from 0.029 to 0.108 with an average of 0.07.

From the results also shows that there is no association of the informal (correlation 0.35) and of the status composite indicators (correlation 0.11) with the precarious work composite indicator, whereas there is a significant association between the last two indicators (correlation 0.69).

In this region public services, oil and related activities, air transport, construction (labour intensive) and related activities, heavy/light manufacturing, utility sectors and a few service sector are among those considered as having DW characteristics, while typically trade, hotels, light manufacturing, construction (capital intensive), agriculture based and extractive sectors are among those not meeting DW characteristics.

Composite Indicators Top 15 and Bottom 5: Precarious Work, Backward Linkages, Cumulative Labour Multipliers and Scenario Results

The number of regions to analyse and report is very large; hence parts of the presentation in the study will only focus on two prominent examples in the following sub-section, Java & Bali, richest with the most diverse and robust economy, and Sulawesi, one of the two poorest regions and with the least natural resource base.

In order to gain more insight, about the region sectors, in the next table, the top 15 DW sectors are listed ranked according to one DW and three model indicators.

The first (DW) measures whether how each sector fares regarding decent work, the second (BKG) indicates the high economic potential impact, the third (LabMul) indicates the high labour creation potential impact and the fourth (Simul) the actual high economic impact as measure by the simulation result. First the results of the Java & Bali are presented and then those for the Sulawesi region.

Java & Bali Top 15 Indicators

The regionally compared DW indicators for the Java & Bali region (see table 7) indicate that there is no pattern either per indicator or across indicators, i.e. most indicators show that sectors are different depending on the indicator ranking and looking at each indicator the sector variation does not seem to correspond to type economy-wide sector (extractive, primary, secondary, utility or service) or technology (labour or capital intensity).....

More concretely, we see that “Air Transport” is the top compliant with DW, however in terms of economic and labour creation potential “Paddy” is the top and has the highest has the lowest number of sectors and the according to the simulation results trade is top.

The top 2 DW corresponds to Palm Oil, according to BKG “Food Crops” is top 2, according to LabMul “Estate Crops” and according to Simul “Other Services” are top 2.

The top third DW corresponds to “Metal processing”, according to BKG “Public Services” is top 3, according to LabMul “Other Services” and according to Simul “Irrigation and Building” are top 3.

Table 14. Java & Bali Top 15 Activity Indicators: Precarious Work (DW), Backward Linkages (BKG), Cumulative Labour Multipliers (LabMul) and Scenario Results (Simul)

Java & Bali Top 15	Rank	Java & Bali DW Economic Activities	Indicator
DW TOP 1	34	JaBa PA Air Transportation	0.00
BKGTOP 1	1	JaBa PA Paddy	6.33
LabMul TOP 1	81	JaBa PA Paddy	0.145
Simul TOP 1	110	JaBa PA Trade	29,039
DW TOP 2	10	JaBa PA Oil Palm	0.00
BKGTOP 2	2	JaBa PA Other Foodcrops	6.24
LabMul TOP 2	83	JaBa PA Estatecrops	0.101
Simul TOP 2	118	JaBa PA Other Services	12,147
DW TOP 3	21	JaBa PA Metal Processing	0.0000
BKGTOP 3	37	JaBa PA Public Services	6.17
LabMul TOP 3	118	JaBa PA Other Services	0.093
Simul TOP 3	108	JaBa PA Irrigation and Buildings (KI)	11,952
DW TOP 4	20	JaBa PA Basic Metal	0.0001
BKGTOP 4	30	JaBa PA Trade	6
LabMul TOP 4	84	JaBa PA Livestock	0
Simul TOP 4	81	JaBa PA Paddy	10,515
DW TOP 5	22	JaBa PA Electricity Machinery	0.0001
BKGTOP 5	31	JaBa PA Hotel and Restaurant	5.60
LabMul TOP 5	86	JaBa PA Fishery	0.092
Simul TOP 1	107	JaBa PA Road Non Rural & Provincial (KI)	8,173
DW TOP 6	18	JaBa PA Petrochemical	0.0002
BKGTOP 6	4	JaBa PA Livestock	5.59
LabMul TOP 6	82	JaBa PA Other Foodcrops	0.0907
Simul TOP 6	82	JaBa PA Other Foodcrops	7,857
DW TOP 7	29	JaBa PA Construction Rest (LI)	0.0004
BKGTOP 7	12	JaBa PA Food and Drink Processing	5.41
LabMul TOP 7	85	JaBa PA Forestry	0.0880
Simul TOP 7	84	JaBa PA Livestock	5,653
DW TOP 8	16	JaBa PA Pulp and Paper	0.0004
BKGTOP 8	11	JaBa PA Fish Processing	5.40
LabMul TOP 8	110	JaBa PA Trade	0.0643
Simul TOP 8	95	JaBa PA Wood Processing	5,227
DW TOP 9	19	JaBa PA Cement	0.0005
BKGTOP 9	3	JaBa PA Estatecrops	5.28
LabMul TOP 9	111	JaBa PA Hotel and Restaurant	0.0615
Simul TOP 9	111	JaBa PA Hotel and Restaurant	4536
DW TOP 10	5	JaBa PA Forestry	0.0012
BKGTOP 10	6	JaBa PA Fishery	5.27
LabMul TOP 10	92	JaBa PA Food and Drink Processing	0.0604
Simul TOP 10	112	JaBa PA Land Transportation	3868.9
DW TOP 11	17	JaBa PA Rubber Processing	0.0013
BKGTOP 11	5	JaBa PA Forestry	5.19
LabMul TOP 11	112	JaBa PA Land Transportation	0.0552
Simul TOP 11	92	JaBa PA Food and Drink Processing	3668
DW TOP 12	25	JaBa PA Electricity, Gas and Drinking Water	0.0017
BKGTOP 12	32	JaBa PA Land Transportation	5.18
LabMul TOP 12	117	JaBa PA Public Services	0.0547
Simul TOP 12	83	JaBa PA Estatecrops	2876.9
DW TOP 13	37	JaBa PA Public Services	0.0026
BKGTOP 13	34	JaBa PA Air Transportation	5.00
LabMul TOP 13	95	JaBa PA Wood Processing	0.0534
Simul TOP 13	109	JaBa PA Construction Rest (LI)	2787.0
DW TOP 14	8	JaBa PA Coal and Other Mining	0.0026
BKGTOP 14	13	JaBa PA Textiles	4.99
LabMul TOP 14	91	JaBa PA Fish Processing	0.0511
Simul TOP 14	116	JaBa PA Finance	2403
DW TOP 15	7	JaBa PA Oil, Gas and Geothermal Mining	0.0041
BKGTOP 15	29	JaBa PA Construction Rest (LI)	4.99
LabMul TOP 15	108	JaBa PA Irrigation and Buildings (KI)	0.0470
Simul TOP 15	86	JaBa PA Fishery	2235

Table 15. Sulawesi Top 15 Activities: Precarious Work (DW), Backward Linkages (BKG), Cumulative Labour Multipliers (LabMul) and Scenario Results (Simul)

Sulawesi Top 15	Rank	Sulawesi DW Economic Activities	Indicator
DW TOP 1	37	Sul PA Public Services	0.00
BKGTOP 1	10	Sul PA Oil Palm	4.56
LabMul TOP 1	205	Sul PA Oil, Gas and Geothermal Mining	0.142
Simul TOP 1	228	Sul PA Trade	1,399
DW TOP 2	22	Sul PA Electricity Machinery	0.00
BKGTOP 2	4	Sul PA Livestock	4.37
LabMul TOP 2	236	Sul PA Other Services	0.130
Simul TOP 2	226	Sul PA Irrigation and Buildings (KI)	461
DW TOP 3	21	Sul PA Metal Processing	0.00
BKGTOP 3	2	Sul PA Other Foodcrops	4.35
LabMul TOP 3	199	Sul PA Paddy	0.128
Simul TOP 3	236	Sul PA Other Services	446
DW TOP 4	19	Sul PA Cement	0.00
BKGTOP 4	1	Sul PA Paddy	4
LabMul TOP 4	221	Sul PA Transport Equipment	0
Simul TOP 4	225	Sul PA Road Non Rural & Provincial (KI)	320
DW TOP 5	14	Sul PA Foot and Leather	0.00
BKGTOP 5	31	Sul PA Hotel and Restaurant	4.311
LabMul TOP 5	216	Sul PA Petrochemical	0.120
Simul TOP 1	213	Sul PA Wood Processing	242
DW TOP 6	9	Sul PA Refinery	0.00
BKGTOP 6	12	Sul PA Food and Drink Processing	4.20
LabMul TOP 6	229	Sul PA Hotel and Restaurant	0.0950
Simul TOP 6	229	Sul PA Hotel and Restaurant	236
DW TOP 7	18	Sul PA Petrochemical	0.000
BKGTOP 7	37	Sul PA Public Services	4.19
LabMul TOP 7	215	Sul PA Rubber Processing	0.0945
Simul TOP 7	206	Sul PA Coal and Other Mining	231
DW TOP 8	25	Sul PA Electricity, Gas and Drinking Water	0.000
BKGTOP 8	3	Sul PA Estatecrops	4.17
LabMul TOP 8	201	Sul PA Estatecrops	0.0909
Simul TOP 8	203	Sul PA Forestry	214
DW TOP 9	20	Sul PA Basic Metal	0.0005
BKGTOP 9	11	Sul PA Fish Processing	4.13
LabMul TOP 9	228	Sul PA Trade	0.0741
Simul TOP 9	201	Sul PA Estatecrops	154
DW TOP 10	34	Sul PA Air Transportation	0.0005
BKGTOP 10	6	Sul PA Fishery	4.07
LabMul TOP 10	203	Sul PA Forestry	0.0686
Simul TOP 10	227	Sul PA Construction Rest (LI)	138.1
DW TOP 11	13	Sul PA Textiles	0.0011
BKGTOP 11	15	Sul PA Wood Processing	3.97
LabMul TOP 11	213	Sul PA Wood Processing	0.0671
Simul TOP 11	230	Sul PA Land Transportation	118
DW TOP 12	11	Sul PA Fish Processing	0.0017
BKGTOP 12	5	Sul PA Forestry	3.94
LabMul TOP 12	211	Sul PA Textiles	0.0661
Simul TOP 12	199	Sul PA Paddy	117.6
DW TOP 13	4	Sul PA Livestock	0.0026
BKGTOP 13	16	Sul PA Pulp and Paper	3.70
LabMul TOP 13	210	Sul PA Food and Drink Processing	0.0614
Simul TOP 13	204	Sul PA Fishery	107.0
DW TOP 14	26	Sul PA Road Rural (LI)	0.0036
BKGTOP 14	29	Sul PA Construction Rest (LI)	3.65
LabMul TOP 14	208	Sul PA Oil Palm	0.0478
Simul TOP 14	234	Sul PA Finance	78
DW TOP 15	10	Sul PA Oil Palm	0.0042
BKGTOP 15	20	Sul PA Basic Metal	3.60
LabMul TOP 15	204	Sul PA Fishery	0.0465
Simul TOP 15	210	Sul PA Food and Drink Processing	52

Table16. Java & Bali Bottom 5 Indicators: Precarious Work (DW), Backward Linkages BKG), Cumulative Labour Multipliers (LabMul) and Scenario Results (Simul)

Java & Bali Bottom 5 Economic Activities	Rank	Java & Bali DW	Indicator
DW Bottom 1	31	JaBa PA Hotel and Restaurant	0.2077
BKG Bottom 1	9	JaBa PA Refinery	3.0036
CumLabMul Bottom 1	89	JaBa PA Refinery	0.0115
Simul Bottom 1	90	JaBa PA Oil Palm	1.5901
DW Bottom 2	6	JaBa PA Fishery	0.1629
BKG Bottom 2	21	JaBa PA Metal Processing	3.1512
CumLabMul Bottom 2	105	JaBa PA Electricity, Gas and Drinking Water	0.0164
Simul Bottom 2	114	JaBa PA Air Transportation	7.1647
DW Bottom 3	27	JaBa PA Road Non Rural & Provincial (KI)	0.1292
BKG Bottom 3	18	JaBa PA Petrochemical	3.5209
CumLabMul Bottom 3	100	JaBa PA Basic Metal	0.0198
Simul Bottom 3	89	JaBa PA Refinery	23.3612
DW Bottom 4	32	JaBa PA Land Transportation	0.1094
BKG Bottom 4	25	JaBa PA Electricity, Gas and Drinking Water	3.6051
CumLabMul Bottom 4	87	JaBa PA Oil, Gas and Geothermal Mining	0.0203
Simul Bottom 4	88	JaBa PA Coal and Other Mining	41.0571
DW Bottom 5	1	JaBa PA Paddy	0.0832
BKG Bottom 5	20	JaBa PA Basic Metal	3.6315
CumLabMul Bottom 5	101	JaBa PA Metal Processing	0.0214
Simul Bottom 5	102	JaBa PA Electricity Machinery	44.2268

Table. 17 East Indonesia Bottom 5: Precarious Work (DW), Backward Linkages BKG), Cumulative Labour Multipliers (LabMul) and Scenario Results (Simul)

Sulawesi Bottom 5	Rank	Sulawesi DW Economic Activities	Indicator
DW Bottom 1	12	Sul PA Food and Drink Processing	0.1090
BKG Bottom 1	9	Sul PA Refinery	1.0000
CumLabMul Bottom 1	207	Sul PA Refinery	0.00
Simul Bottom 1	207	Sul PA Refinery	0.00
DW Bottom 2	29	Sul PA Construction Rest (LI)	0.0834
BKG Bottom 2	14	Sul PA Foot and Leather	1.0000
CumLabMul Bottom 2	212	Sul PA Foot and Leather	0.00
Simul Bottom 2	212	Sul PA Foot and Leather	0.00
DW Bottom 3	6	Sul PA Fishery	0.0817
BKG Bottom 3	34	Sul PA Air Transportation	2.6179
CumLabMul Bottom 3	232	Sul PA Air Transportation	0.02
Simul Bottom 3	208	Sul PA Oil Palm	0.17
DW Bottom 4	1	Sul PA Paddy	0.0628
BKG Bottom 4	25	Sul PA Electricity, Gas and Drinking Water	2.7711
CumLabMul Bottom 4	233	Sul PA Communications	0.02
Simul Bottom 4	220	Sul PA Electricity Machinery	0.27
DW Bottom 5	2	Sul PA Other Foodcrops	0.0552
BKG Bottom 5	18	Sul PA Petrochemical	2.9764
CumLabMul Bottom 5	223	Sul PA Electricity, Gas and Drinking Water	0.0189
Simul Bottom 5	214	Sul PA Pulp and Paper	0.4597

Source of Tables 13-18: IRSAM2005_ConsExtModelPilotDW2013SimulEmpl; worksheet <SummaryDWMaLMaSim>

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