



Employment projection models, job quality and education

Workshop on Employment Projections

Jakarta, November 2013



Employment Trends

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Overview



- Objectives of employment projection models
- The Philippines Employment Projections Model
 - Macroeconomic scenarios and employment
 - Projecting job quality
- Structural change, employment and education
 - Skills and qualifications mismatch
- Model development and discussion

[2]



Background and objectives

Demand for projection models

- Policy-related
 - Produce alternative projections based on different assumptions (austerity versus stimulus)
 - Assess impact of exogenous economic shocks
 - Evaluate policy measures
- Development-related
 - Structural change and employment
 - Industrial/sectoral policy
- Employment services - guidance and counselling
- Development of labour market information and analysis systems (Sparreboom, 2013)
 - Provide a consistent framework to analyse the economy & labour market
 - LMIA systems: tracking indicators → Extrapolations → Relationships and projections → Models
 - Capacity building and information exchange

(3)



Background and objectives

Anticipation of skills needs

- A major part of the interest for EPMs is related to the anticipation of labour and skills requirements
- Manpower planning, a technique that used macroeconomic and sector forecasts to derive how many workers with specific (technical) skills would be needed, was popular in the 1960s and 1970s (Jolly and Colclough, 1972; World Bank, 2012a, box 5.8)
- In most developed economies the focus has shifted from ensuring an adequate supply of skills to delivering demand-responsive, quality education and training systems with information for all labour market participants (Wilson et al., 2013)
- Nevertheless, employment projections often constitute an important element in the anticipation of skills requirements



Background and objectives

Types and (dis-)advantages of projection models

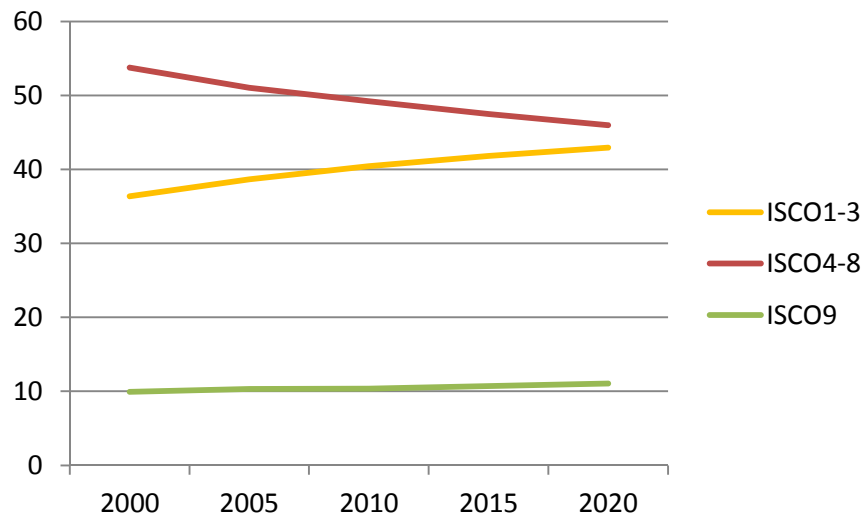
- *Comprehensive macroeconomic and labour market models*; Cedefop macroeconomic multisectoral and multi-country model (E3ME); labour market module includes employment demand, average wages, average hours worked and participation rates (Cedefop, 2012a and 2012b)
- *Models with more limited macro/labour market scope focused on developing country context*; ILO country employment projection models have been developed for Ukraine (2008), Viet Nam (Viet Nam Ministry of Labour, Invalids and Social Affairs, 2011), Mongolia (2011) and the Philippines (El Achkar et al., 2013); under development for Columbia and Peru (2013)
- *Occupational projection models*, e.g. Namibian Occupational Demand and Supply Outlook Model (NODSOM)
- *Advantages* of projection models: comprehensive; consistent; transparent. *Disadvantages*: data hungry; costly; not everything is quantifiable; may give false impression of precision
- *Alternative approaches*: see Wilson et al (2013); Sparreboom and Powell (2009)



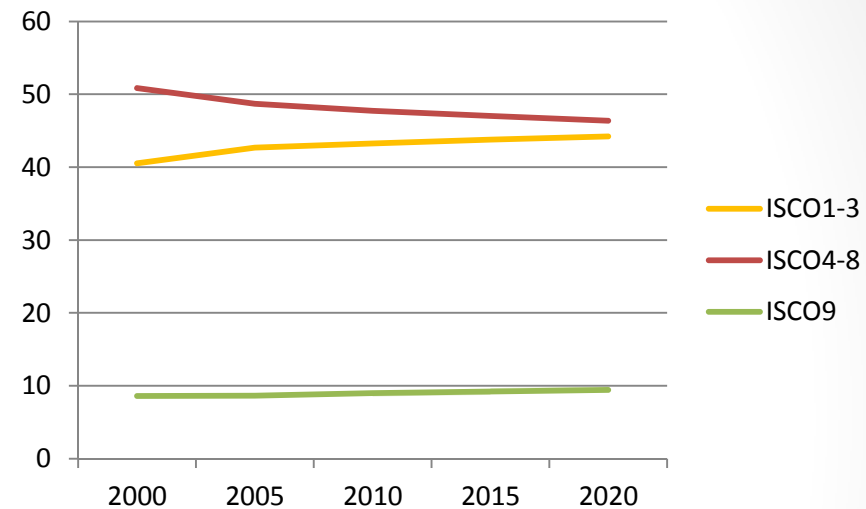
Background and objectives

Cedefop European occupational projections (%)

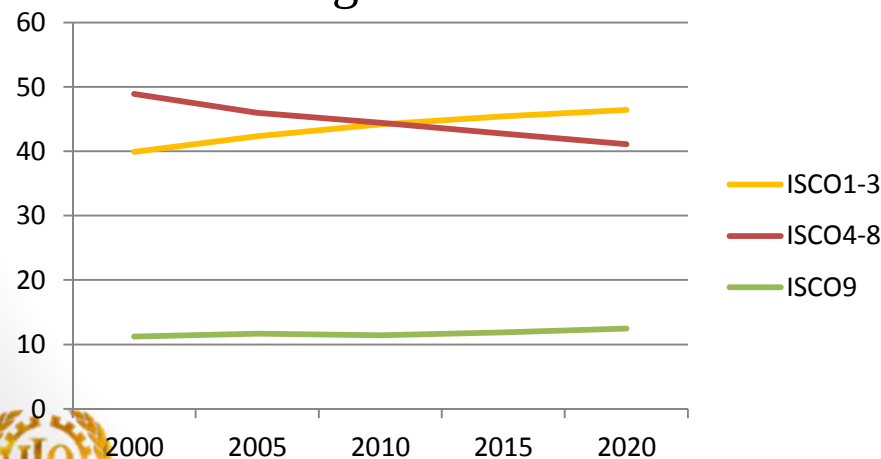
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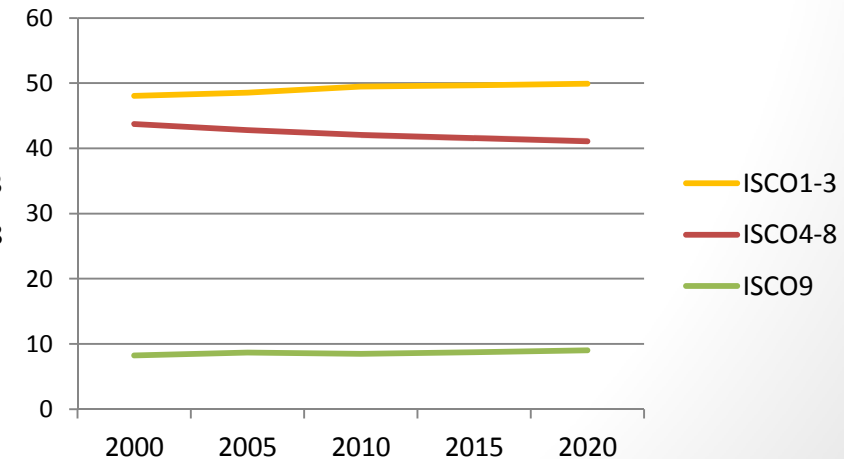
Germany



United Kingdom



Netherlands



Philippines Employment Projection Model

Methodology

- Cooperation between ILO Trends and Inforum (University of Maryland)
- Interindustry macroeconometric models based on input output relationship
- Models vary in complexity, depending on data availability and quality, resources available and purpose (Werling and Meade, 2010)
- In Stata: accessible, user friendly; can be updated and expanded/developed



Philippines Employment Projection Model

Data requirements

Time series:

1. GDP by sector, current and constant prices (supply)
2. GDP by expenditure (C, I, G, etc.), current and constant prices (demand)
3. Gross output by sector
4. Employment by sector; total population and economically active population

For one or more years:

5. Input-output table
6. Sectoral employment-occupation matrix



Philippines Employment Projection Model

Model mechanics (1): historical data adjustment

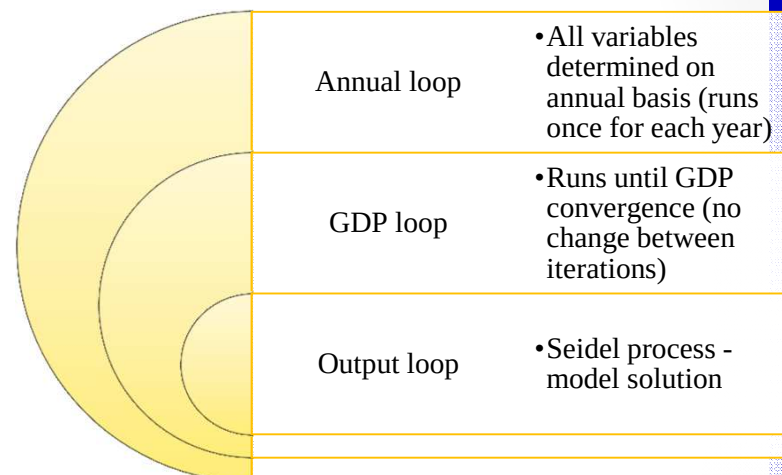
- Aggregating industry data such that data from all sources refer to the same 25 industries (including 7 manufacturing industries)
- Interpolating data series and adjusting GDP expenditure components to national account totals
- Ensuring common base year, no break in series, etc.
- Updating IO table consistently with the industry and national account totals
 - IO table for the Philippines is available for 2000 only, but elements of the 2006 IO table have been used
 - RAS process: bi-proportional scaling



Philippines Employment Projection Model

Model mechanics (2): concentric loops

- Annual loop determines nominal/real values using exogenous variables (e.g. investment, exports, GDP deflator)
- GDP loop determines private and government consumption as well as imports (endogenous variables) simultaneously with final demands at industry level
- Output loop determines gross output by industry and industry imports



Philippines Employment Projection Model

Model mechanics (3): labour market outcomes

- Annual loop
 - Labour productivity ratios applied to projected output to obtain employment by industry
 - Employment by occupation obtained from employment by industry using the industry-occupation matrix
 - Unemployment obtained as a residual from ILO labour force projections (EAPEP dataset)

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Philippines Employment Projection Model

Model results (1): real GDP and components

							Annual or average annual change (%)					
	Actual		Projected				Actual		Projected			
	2000	2008	2009	2010	2013	2016	00-10	08-09	09-10	10-13	13-16	10-16
Real GDP (bil. 2000 PHP)	3,581	5,237	5,297	5,702	6,452	7,734	4.8	1.1	7.6	4.2	6.2	5.2
Final consumption	2,994	4,225	4,366	4,516	5,064	5,817	4.2	3.3	3.4	3.9	4.7	4.3
Final consumption of households	2,585	3,731	3,818	3,946	4,429	5,084	4.3	2.3	3.4	3.9	4.7	4.3
Final consumption of government	409	494	548	570	635	733	3.4	10.9	4.0	3.6	4.9	4.3
Gross capital formation	658	985	899	1,184	1,346	1,571	6.1	-8.7	31.6	4.4	5.3	4.8
Net exports	-71	27	32	2	43	346						
Exports	1,839	2,589	2,386	2,886	3,062	3,744	4.6	-7.8	21.0	2.0	6.9	4.4
Imports	1,911	2,561	2,354	2,884	3,020	3,399	4.2	-8.1	22.5	1.5	4.0	2.8

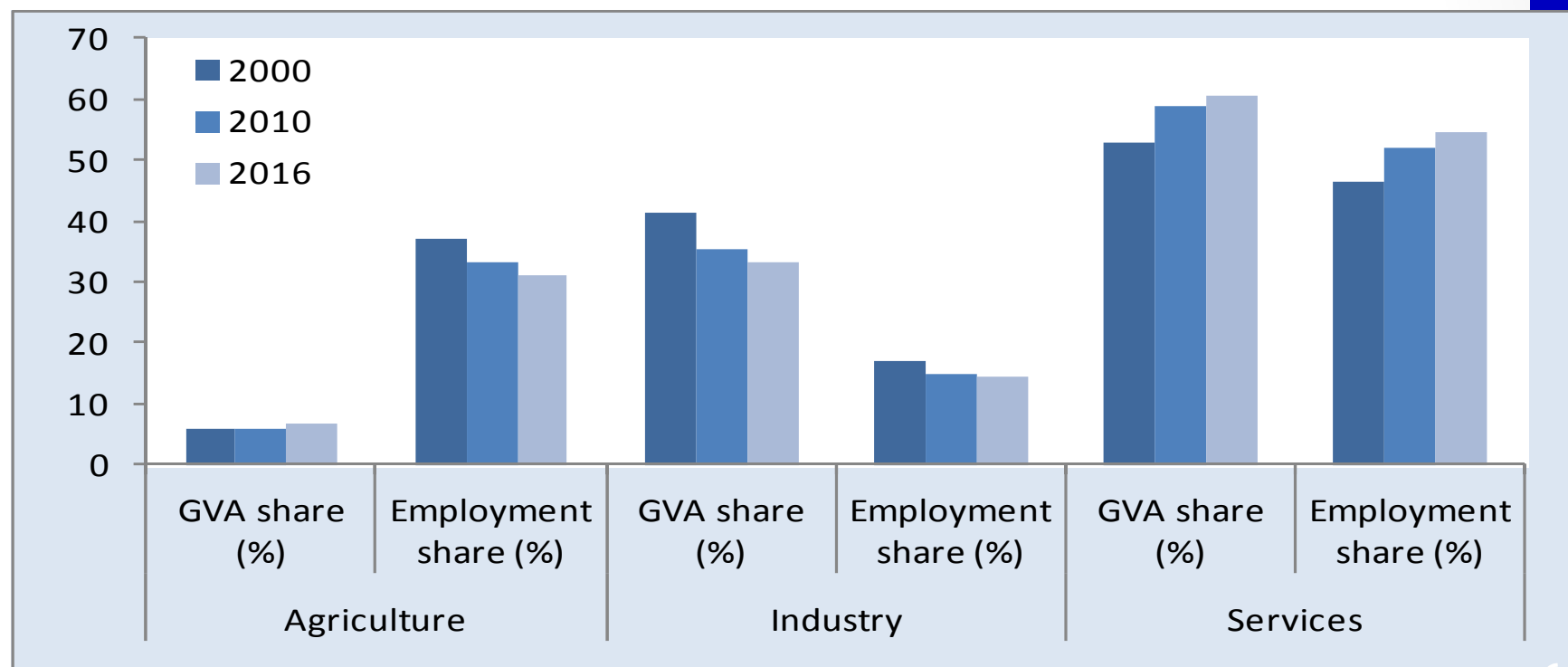
Philippines Employment Projection Model

Model results (2): labour market aggregates

							Annual or average annual change (%)					
	Actual			Projected			Actual		Projected			
	2001	2008	2009	2010	2013	2016	01-10	08-09	09-10	10-13	13-16	10-16
Total population (mil.)	77.7	90.2	92.0	93.8	99.1	104.4	2.1	2.0	1.9	1.9	1.8	1.8
Working age population (15+, mil.)*	48.9	57.8	59.2	60.7	65.2	69.6	2.4	2.4	2.5	2.4	2.2	2.3
Labor Force (mil.)	31.4	36.8	37.9	38.9	41.6	44.5	2.4	3.0	2.6	2.3	2.2	2.3
Employment (mil.)	29.2	34.1	35.1	36.0	38.4	41.4	2.4	2.9	2.8	2.2	2.5	2.3
Unemployment (mil.)	2.2	2.7	2.8	2.9	3.2	3.1	3.0	4.2	1.0	3.9	-0.9	1.5
Labour Productivity (thous. PHP per worker)	126.4	153.6	151.1	158.2	167.9	186.9	2.5	-1.7	4.7	2.0	3.6	2.8
Labor Force Participation Rate (%)	64.1	63.6	64.0	64.1	63.9	63.9						
Employment-to-population Rate (%)	59.6	58.9	59.2	59.3	59.0	59.4						
Unemployment Rate (%)	7.0	7.4	7.5	7.3	7.7	7.0						

Philippines Employment Projection Model

Model results (3): employment and value added by sector



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Philippines Employment Projection Model

Model results (4): employment by industry sub-sector

	<i>Actual</i>						<i>Annual or average annual change (%)</i>					
	<i>Actual</i>		<i>Projected</i>				<i>Actual</i>		<i>Projected</i>			
	2001	2008	2009	2010	2013	2016	01-10	08-09	09-10	10-13	13-16	10-16
Mining and Quarrying	103	158	166	199	225	276	7.5	5.0	19.8	4.2	7.1	5.6
Manufacturing	2,905	2,926	2,893	3,033	3,019	3,120	0.5	-1.1	4.8	-0.1	1.1	0.5
Food Products, Beverages, and Tobacco Products	682	711	750	791	851	923	1.6	5.5	5.5	2.5	2.7	2.6
Textiles, Wearing Apparel and Leather Products	768	658	619	629	541	489	-2.2	-5.9	1.6	-4.9	-3.3	-4.1
Wood and Paper Products, Printing and Publishing	361	425	452	480	542	627	3.2	6.3	6.2	4.2	4.9	4.5
Non-metallic Mineral Products	235	229	256	249	274	289	0.6	11.7	-2.6	3.2	1.8	2.5
Basic Metals and Metal Products	206	190	186	192	195	211	-0.8	-1.8	2.8	0.6	2.7	1.6
Machinery and Equipment	412	504	440	497	453	429	2.1	-12.7	12.9	-3.1	-1.8	-2.4
Manufacturing and Repair of Furniture, Recycling and Manufacturing NEC	240	209	190	195	163	152	-2.3	-9.1	2.7	-5.9	-2.2	-4.1
Electricity, Gas, Steam and Air-Conditioning Supply	84	82	88	85	86	92	0.0	7.2	-4.0	0.4	2.2	1.3
Water Supply, Sewerage, Waste Management and Remediation Activities	50	67	68	80	85	97	5.3	2.8	16.5	2.3	4.3	3.3
Construction	1,585	1,834	1,891	2,017	2,185	2,357	2.7	3.1	6.6	2.7	2.6	2.6
Industry	4,729	5,067	5,107	5,412	5,601	5,942	1.5	0.8	6.0	1.1	2.0	1.6

Employment quality

- Vulnerable employment rate, which is defined as (the number of own-account workers + number of contributing family workers)/total employment. This indicator is based on the classification by status in employment (ICSE), revised at the 15th ICLS in 1993. ICSE defines status categories, largely based on types of economic risk associated with a job.
- Working poverty rate, defined as employed persons in a household whose members are living below the poverty line, as a proportion of total employment. For international comparisons, \$1.25 (PPP) poverty line is used; for national monitoring, national poverty line is preferred.
- In PEPM, vulnerable employment and working poverty are projected using the shares in each of 25 sectors.
- Other employment characteristics, including informal employment, can be added.

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Philippines Employment Projection Model

Model results (5): employment quality

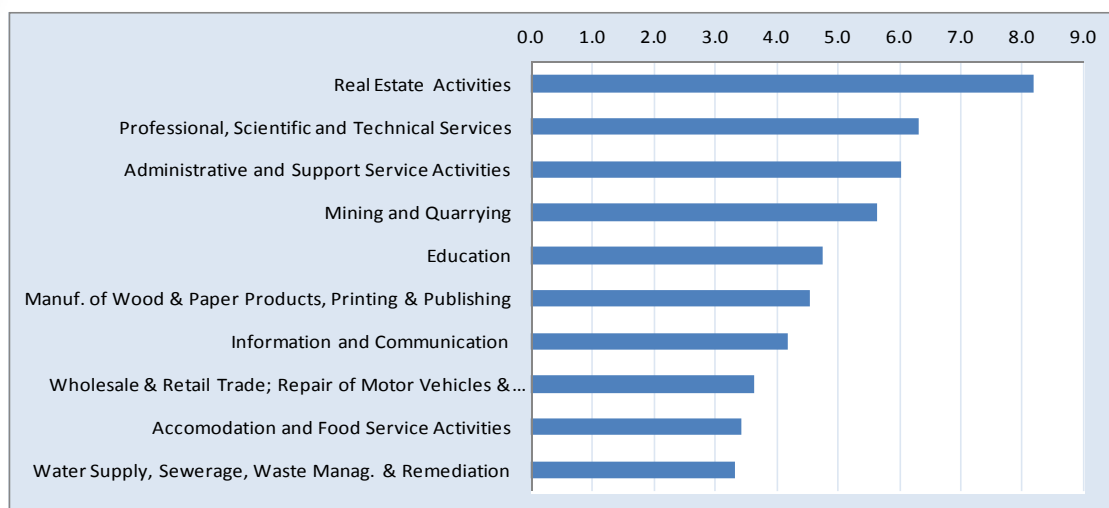
	2003	<i>Actual</i>		<i>Projected</i>			<i>Annual or average annual change (%)</i>					
		2006	2009	2010	2013	2016	<i>Actual</i>		<i>Projected</i>			
							03-06	06-09	09-10	10-13	13-16	10-16
Employment (mil.)	30.6	32.6	35.1	36.0	38.4	41.4	2.1	2.4	2.8	2.2	2.5	2.3
Vulnerable employment (mil.)	13.7	14.5	14.9	15.0	15.9	16.7	2.1	0.9	0.5	1.9	1.7	1.8
VER (%)	44.6	44.5	42.6	41.7	41.4	40.4						
Working poverty (1.25\$/day, mil.)	5.7	6.5	5.7	6.0	6.1	6.2	4.1	-4.2	5.8	0.7	0.3	0.5
WPR (1.25\$/day, %)	18.7	19.8	16.2	16.6	15.9	14.9						
Working poverty (2.00\$/day, mil.)	12.3	13.7	13.6	14.0	14.8	15.4	3.8	-0.2	2.9	1.7	1.4	1.6
WPR (2.00\$/day, %)	40.1	42.1	38.9	39.0	38.4	37.2						



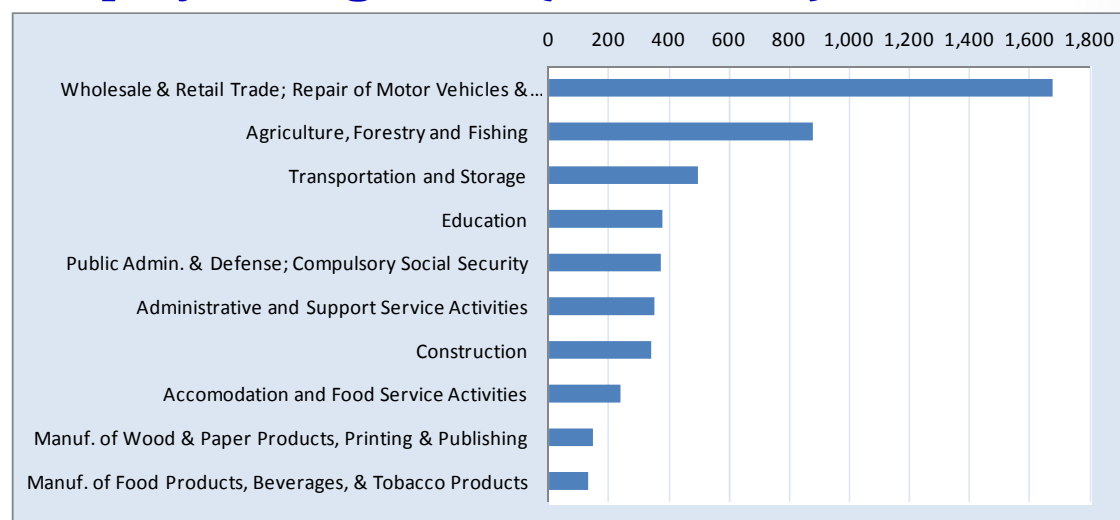
Philippines Employment Projection Model

Model results (6): top 10 employment growth sectors

Average annual employment growth (%), 2010-2016



Employment growth (thousands), 2010-2016



Philippines Employment Projection Model

Austerity scenario

- Final government consumption increased by nearly 11 per cent in 2009 due to stimulus spending in response to the global economic crisis, and by an additional 4 per cent in 2010
- Large budget deficits incurred have led to the need for fiscal consolidation
- Under the austerity scenario, the growth in tax revenues is higher and growth in government expense is lower over the period 2010-2016, resulting in a halving of the fiscal deficit by 2013
- In the model, lower government final consumption and higher taxes lead to slower GDP growth (0.2 percentage points lower than the baseline); directly, because government consumption is a component of GDP, and indirectly through its impact on private consumption (feedback effects)



Philippines Employment Projection Model

Model results (7): austerity scenario – labour market impact

- Lower economic growth results in slower employment growth and higher increases in unemployment
- The unemployment rate would reach 7.6 per cent in 2016, 0.7 percentage point higher than the baseline scenario, and the employment-to-population rate would be 59 per cent, 0.4 percentage point lower than the baseline projection
- Progress on achieving the other MDG employment indicators would be slower as well: lower labour productivity growth, slower decline in working poverty and in vulnerable employment

MDG Indicator		LP growth rate	EPR	WPR1	VER
	2005	2.51	59.4	19.4	44.8
	2010	4.72	59.3	16.6	41.7
Baseline projection	2015	3.60	59.2	15.2	40.7
Austerity scenario	2015	3.57	58.9	15.3	40.9
Total change	2005-2010	2.21	-0.1	-2.7	-3.1
Baseline Forecasted Change	2010-2015	-1.12	-0.1	-1.4	-0.9
Austerity Forecasted Change	2010-2015	-1.15	-0.5	-1.3	-0.8



Structural change, employment and education

Skills development in the Philippines, see *Asian Development Outlook 2007: Growth amid change*, Asian Development Bank (Manila):

- Education levels are rising 'too fast':
 - Structural change and education intensity (shift/share analysis)
 - Rate of returns on education by broad economic sector
 - Review of selected occupations
- Education intensification is not driven by productivity imperatives
- Expectations of the contribution of education to structural change must be rooted in an empirical understanding of what workers are likely to do with their education

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Structural change, employment and education

Decomposition of change in education intensity (shift/share analysis)

	Period	Between sector change in education intensity (%)	Within sector change in education intensity (%)	Education intensity (end of period, %)	Share of agriculture in the labour force (end of period, %)	GDP per capita (constant 2000 US\$; end of period)
Tanzania	2001-2006	88.3	11.7	5.9	70.0	392
India	1993-2004	37.3	62.7	21.5	51.3	525
Indonesia	1994-2004	9.6	90.4	45.9	40.5	876
Philippines	1991-2004	29.0	71.0	50.9	33.1	1,153
Thailand	1995-2005	17.0	83.0	36.5	42.0	2,360

Note: education intensity is defined as the proportion of workers with at least secondary education
Sources: ADB (2007); Sparreboom and Nübler (2013); World Bank (2012b).

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Structural change, employment and education

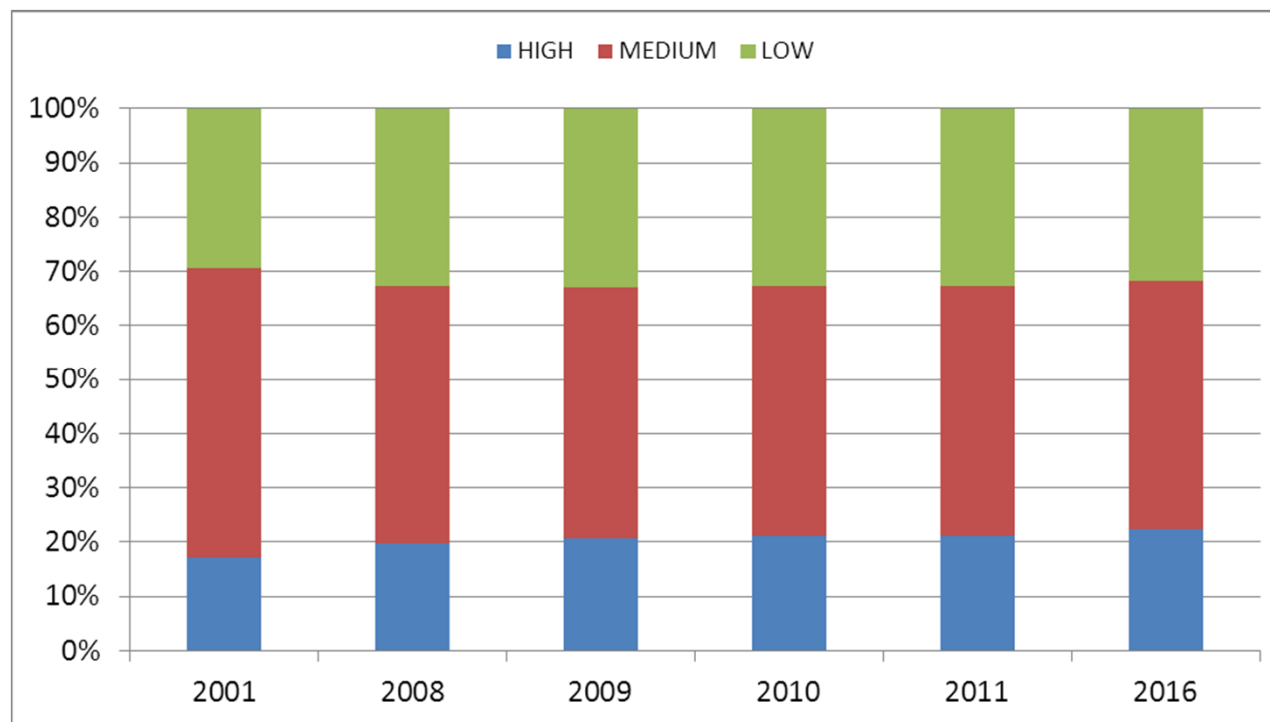
Patterns in rate of returns to education

	Period	Primary	Secondary	Tertiary
Tanzania	2001-2006			
Philippines	1991-2004			
Latin America	pre 2000 vs post 2000			
Developing world	pre 2000 vs post 2000		?	?

Sources: ADB (2007); Colclough et al. (2010); Lustig et al. (2013); Sparreboom and Nübler (2013).

Philippines Employment Projection Model

Model results (8): occupational distribution and skills



ISCO-1988 – Major groups

- | | |
|---|---|
| 1 | Legislators, senior officials and managers |
| 2 | Professionals |
| 3 | Technicians and associate professionals |
| 4 | Clerks |
| 5 | Service workers and shop and market sales workers |
| 6 | Skilled agricultural and fishery workers |
| 7 | Craft and related trades workers |
| 8 | Plant and machine operators and assemblers |
| 9 | Elementary occupations |
| 0 | Armed forces |

ISCO skill level*

- | |
|----|
| -- |
| 4 |
| 3 |
| 2 |
| 2 |
| 2 |
| 2 |
| 2 |
| 1 |
| -- |



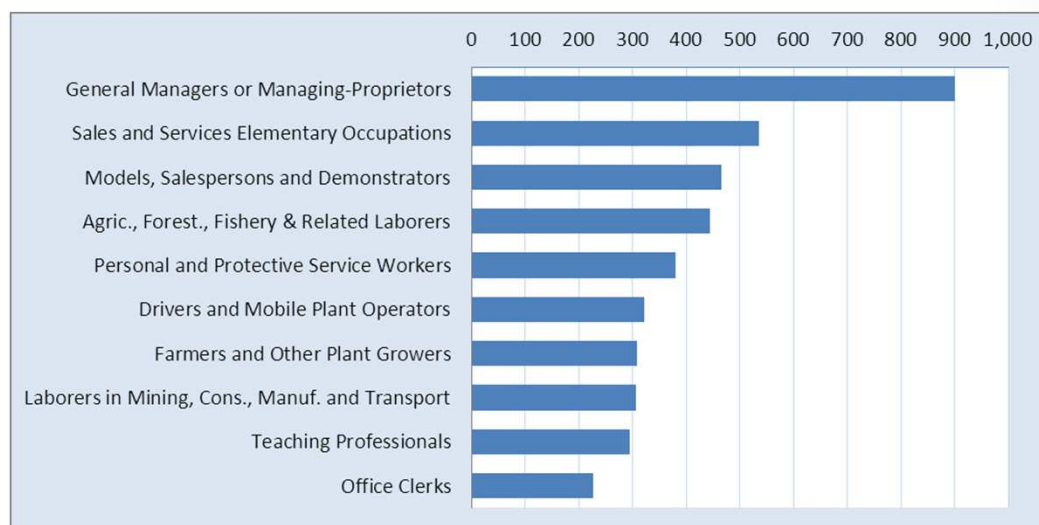
Philippines Employment Projection Model

Model results (9): growth in occupational subgroups



**Average annual
employment growth
(%), 2010-2016:
Top 10 occupational
subgroups**

**Employment growth
(thousands), 2010-2016:
Top 10 occupational
subgroups**



Employment Trends

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trends

Skills mismatch

Incidence of overqualification and underqualification

Underqualification (%)	2001/02	2004	2006	2008	2010
Europe	36.4	34.5	32.0	31.5	28.6
Philippines	35.9				29.4
Tanzania	93.5		90.7		

Overqualification (%)	2001/02	2004	2006	2008	2010
Europe	7.4	8.4	8.9	9.5	10.1
Philippines	20.6				25.0
Tanzania	0.2		0.4		

Sources:

ILO (2013); Sparreboom and Nübler (2013); Sparreboom and Tarvid (2013); El Achkar Hilal et al. (2013).



Philippines Employment Projection Model

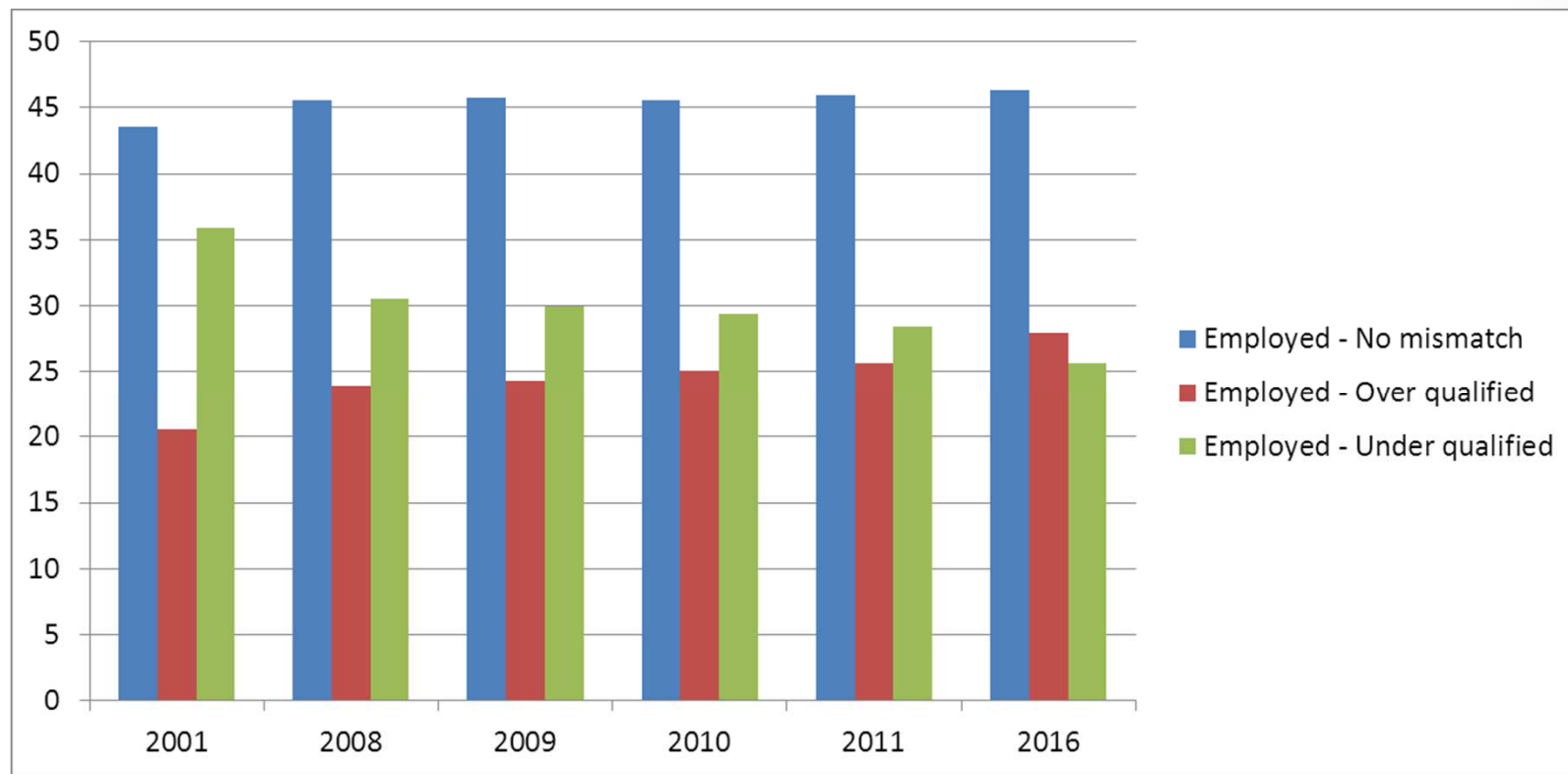
Model results (10): mismatch by major group (2010)

	No mismatch	Over-qualified	Under-qualified
Officials of government and special interest organizations, corporate executives, managers, managing proprietors and supervisors	41.0	0.0	59.0
Professionals	99.6	0.0	0.4
Technicians and associate professionals	71.1	0.0	28.9
Clerks	13.7	79.8	6.5
Service workers and shop and market sales workers	38.3	37.2	24.5
Farmers, forestry workers and fishermen	16.9	8.7	74.5
Trades and related workers	36.3	18.2	45.4
Plant and machine operators and assemblers	42.0	24.7	33.2
Laborers and unskilled workers	62.8	37.2	0.0
Special occupations	31.0	69.0	0.0
All Occupations	45.6	25.0	29.4



Philippines Employment Projection Model

Model results (11): projections of qualifications mismatch



Model development

- Data requirements
- Model development
 - Macroeconomic scenarios and employment
 - Projecting job quality
 - Skills and qualifications mismatch
 - ...
- Discussion



Thank you for your attention

