Development of Manpower Projection and Assessment Tool for Labor Market Projection in Malaysia

Topic: Computable General Equilibrium Modeling and IO Modeling
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Equipping the labor force with the right skills is one of the policies focused on any country to support decent job creation for the people with inclusive growth. For that reason, determination of the future skill surplus and the shortage is important for well-informed and evidence-based policy responses that involve multidimensional interventions such as education and training, international migration and economic sectoral stimulation regimes. In the absence of an appropriate analytical tool, it is such as great challenge for the policy makers to formulate short- and medium-term planning exercises in a systematic and cohesive manner, thus affecting the quality of policies and strategies to attain socio-economic objective of the country. This paper aims to develop a unique database so-called Manpower Projection and Assessment Tool (MPAST) that captures a multitude labor market ecosystems involving the population and demography, education attainments and skill sets, and sectoral labor demand components by occupations. Various datasets from the national account, labor force survey, economic census and other sources are used to construct the MPAST for the case of Malaysia. Based on this unique labor market modeling, several analyses that specifically address the issues of skill surplus and shortage in Malaysia are conducted, which can be projected until year 2030.

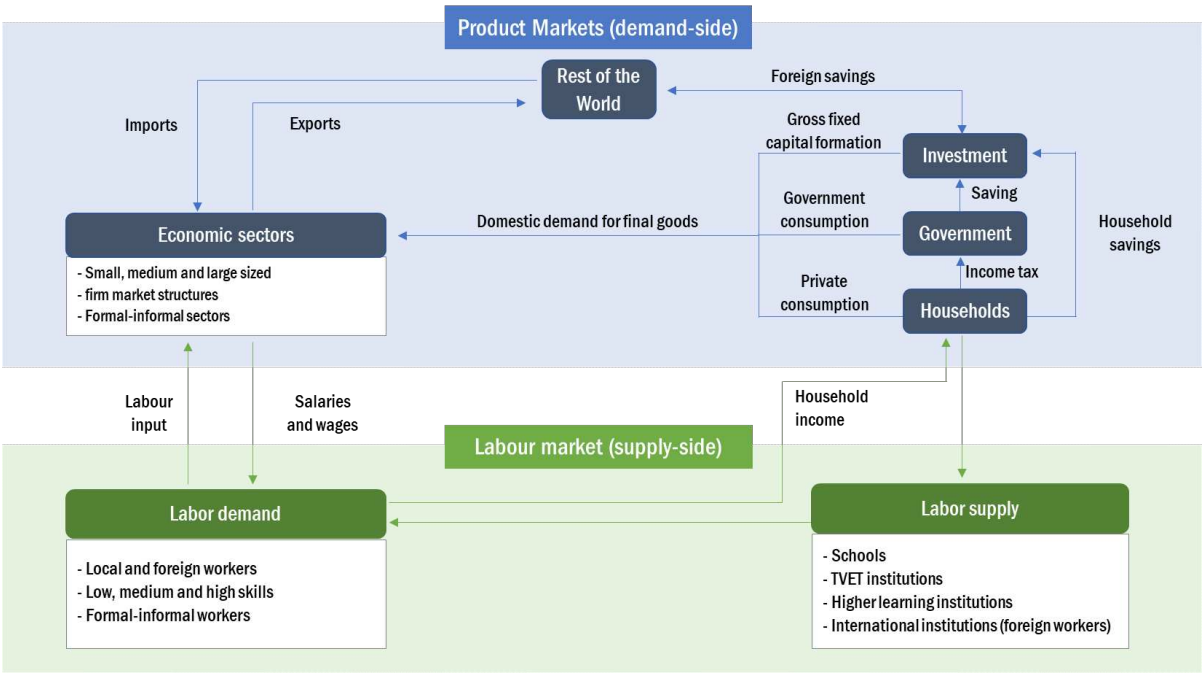
Keywords:
labor; computable general equilibrium; demand and supply of labor; manpower projection

1. Introduction

Equipping the workforce with the skills required for the jobs of today and those of tomorrow is a strategic concern in the national growth and development. Structural change is accelerating the diffusion of technology and the pace of innovation. As a result, new occupations are emerging and replacing others. Within each occupation, required skills and competencies are evolving, as the knowledge content of production processes and services is rising. The changes in economic structures and labor landscape demand for a development of manpower forecasting and assessment tool to anticipating the future employment requirements.

In formulating any policies regards to the labor market, the economic circular flow diagram is the fundamental subject to be understood first as any intervention on some part would affect the other part. In economics, labor is the supply-side variable determined by the demand-side variables such as domestic demand and exports. Figure 1 pictures the inter-linkages between labor and the economic sectors (businesses) and their interactions in the product and labor markets. The direction of the arrows indicates that in the product market, households receive goods and services and pay businesses for them. In the labor market, households provide labor and receive salaries and wages from businesses. The economic loop is completed when the households' salaries and wages return to the economy when they consume goods and services.

Figure 1. Economic circular flow diagram



On the other hand, the product market is the marketplace where intermediate and final goods and services are sold to businesses, households and public sectors. Final goods that are consumed by households, government, investment and the rest of the world (exports)—are the expenditure components of Gross Domestic Product (GDP). The labor market who also known as the job market, refers to the supply of and demand for labor, in which workers provide the supply and employers (economic sectors) provide the demand. The supply of

workers is determined by the learning institutions that include schools, TVET institutions, higher learning institutions and international learning institutions for foreign workers.

Based on the figure, it could be summarized that any policy interventions in the labor and product markets should be expected to have joint effects on the employment level that exceed the separate effects that policy interventions in each market could have when implemented alone. Policy interventions in the product markets commonly are proposed to promote and maximize economic growth, but there are also a direct and indirect consequences to the labor market. For example, the promotion of investment incentives by relaxing several conditions (i.e. number of high-value jobs, number of critical positions, and annual operating expenditure) may decrease foreign-owned firms' demand for skilled workers. In addition, increasing value-added activities in Free Industrial Zones and Licensed Manufacturing Warehouses from 10% to 40% is likely to increase local content in total production and, at the same time, will directly and indirectly increase labor requirements.

This paper aims to develop a unique database so-called Manpower Projection and Assessment Tool (MPAST) that captures a multitude labor market ecosystem involving the population and demography, education attainments and skill sets, and sectoral labor demand components by occupations. Various datasets from the national account, labor force survey, economic census and other sources are used to construct the MPAST for the case of Malaysia. Based on this unique labor market modeling, several analyses that specifically address the issues of skill surplus and shortage in Malaysia are conducted, which can be projected until the year 2030.

This paper is structured into five sections. Section 2 provides initial stocktaking on the manpower projection model. Section 3 presents the overview of the demand and supply components of MPAST. Section 4 shows the key findings obtained from the baseline analysis of MPAST. Section 5 gives concluding remarks.

2. Stocktaking on the manpower projection model

Research on manpower projection is not a new topic when it comes to the labor market. In fact, one of the earliest study made in employment forecasting was conducted as early as 1960s by Parnes (Cohen, 1988; Willems, 1996; Thomas, 2015). However, throughout our research we discover that the differences in the amount of studies made by the developed and the ever developing countries and the coverage among them are very concerning.

Although developed countries are more economically advanced, but the ever-increase problems on the state of employment in the labor market and the need of labor market forecasting to solve these problems are alarming (Korovkin, 2013; Maitah, et al., 2016; Fuchs, Sohnlein, Weber, & Weber, 2018).

One of the countries that has been constantly published numerous papers on employment projection is Germany. In 2030, Germany is predicted to experience severe labor shortages, notably in the field of "health occupations" because not enough professionals are being trained in this field, despite rising demand and the decrease of working-age population (Maier, Neuber-Pohl, Mönnig, Zika, & Kalinowski, 2017; Maier & Afentakis, 2013; Fuchs, Sohnlein, Weber, & Weber, 2018). Maier, Mönnig, and Zika (2015) forecast the demand side of Germany's labor market identified that low-skilled workers, especially in the simple services, will face a reduction in employment in the future and that structural changes in economy will give a substantial impact on changing skill requirements and qualification requirements within occupational sectors. In line with industrial revolution of Industry 4.0, which will increase the number of job loss due to technological enhancements, the labor force of Germany is expected to decline with a vast increase of persons with a tertiary degree education (Gebhardt, Grimm, & Neugebauer, 2015; Loichinger, 2015).

On the other hand, Neumark, Johnson, and Mejia (2013) found out, estimating the labor market unveiled that the supply of those with Associate's Degrees in United States of America (USA) will experienced shortages as there will be an excess supply of those with only a college or high school degree. If this continues, there will be occupations in the future where individuals with less education will be needed to fill the high demand for workers with an Associate's degree. This is supported by the conclusions of an earlier study by Stagliano and Frederic M. Stiner (1985) as well as Barro and Lee(2001), which they found out that the total enrollment in secondary and higher education in the USA to be foreboding after the 1990s. Not to mention, the authors also emphasize on how the increase of enrollment in one's course will reduce the number of enrollment in other areas and create imbalances between the labor demand and supply.

In United Kingdom (UK), Dainty and Edwards (2003) forecasted that the existing capacity and annual industry output will be insufficient to cope with skills demands for the next few years followed by the reduction in applications. The predicted graduate intake will fall far short of need, with a total requirement of 92 500 jobs over the next five years, suggesting a maximum potential shortfall of 66 817 workers. Although the overall trend in the UK higher education sector continues to show a further growth, building-related courses will continue showing a sign of reduction in enrollment and applicants. This is due to the fact that UK institutions are maintaining recruiment levels from a smaller pool of candidates (Dainty & Edwards, 2003). Interestingly, Bosworth, Jones, and Wilson (2008) and Loichinger (2015) saw that there will be a substantial increment in the numbers and proportions of more qualified individuals and corresponding reductions among the less qualified. The growth in qualifications among females also seems to be higher than that of males, due to the growing in the proportion of women enrolled in UK's universities (Bosworth, Jones, & Wilson, 2008; Dainty & Edwards, 2003).

Other developed countries like Canada and Australia have also performed labor market predictions in their own respective countries. According to a research in Canada, there will be an increase share of those aged 45-64 in the year 2031 due to the present average number of fertility rates being considerably lower than in the past (Shannon & Kidd, 2001; Thomas, 2015) . This increment will potentially give impactful consequences for both the future distribution of skill characteristics and associated wage rates. In Australia, Meaghers, Adams and Horridge (2000) along with Meagher and Pang (2011) reveal that the rate of industrial growth would slow in certain industries, such as mining and construction, but will improve in others. However, this was not the case in 1994, when both of these businesses were predicted to increase and have good growth prospects (Adams, Dixon, McDonald, Meagher, & Parmenter, 1994). Due to the importance and competitiveness of these two businesses in the Australian economy, shortages in both companies will have a significant negative impact on the economy (Meagher, Adams, & Horridge, 2000; Wong, Chan, & Chiang, 2004).

As opposed to the countless labor market forecasting research made by the developed countries, developing countries have published minimal papers in this matter. Cao, Ho, Hu, and Jorgenson (2020), who only forecasted the labor supply in China, discovered that low youth participation rates, especially in female and rural workers, will lead to a much slower economic growth and higher dependency ratios. The rate of postgraduate Employment Confidence Index (ECI) in China is also expected to be slowly declining by each year as postgraduates face harsh career pressures and low employment opportunities (Wang, 2014). In addition to the rising life expectancies and falling fertility rates, the number of those in the working-age population will be decreased by 26 percent (as compared to 2010) and China might faced shortage in the labor market in the future (Kim, 2012; Cao, Ho, Hu, & Jorgenson, 2020).

Aside from that, there have been studies in which authors predict employment in numerous developing countries in a single paper. Cohen (1988), for example, projects the manpower from the demand and supply side in Colombia and Pakistan estimates that each year, the two countries will have a 1% increase in underemployment, which correlates to an annual GDP growth rate of 8%. Although it is expected that both countries would undergo a systematic upgrading of educational skills and push more labor to manual jobs, there will be a greater imbalance and adjustment by occupation and education due to the faster pace of development. Another study result by Kim (2012), who estimates the labor supply in 12 rapidly developing Asian countries, found out the labor force in India, Indonesia, Malaysia, Pakistan, and the Philippines will continue to grow from 2009 to 2030, while the labor force in China, Hong Kong, and Taiwan will soar but eventually decline in the last decade, and the labor forces in Thailand and Vietnam will grow at a slower rate.

Regardless, the studies described above only provide information at a high level of abstraction and not in detailed level for policy makers or economists of the respective countries to make the best decision possible. To the best of our knowledge, there has been relatively little exploration into labor market forecasting in Southeast Asian countries. The most recent study was conducted at a Banten Province in Indonesia by Agusalim (2016), which only focused on a regional projection rather than a national projection. This would be an issue of relevancy, given the latest publication in manpower projection was completed 5 years ago (from the year this journal is written) and there have been no fresh studies on this subject since then.

In conclusion, there have been an umpteen of research on manpower projections in wealthy countries, but few in developing ones, particularly Malaysia. Unlike Germany which had studies forecasting employment by different kind of variables, Southeast Asian countries have performed very minimal studies on labor market forecasting since they are still unaware of the impact that it would bring on the economy. It clearly shows that there has been a significantly huge study gap between these two groups of countries and therefore, highlighting the need for our research. We present a summarized version of the study gap among existing journals for a much clearer picture (see Table 1).

Table 1. Stocktaking the selected studies on the manpower projection model

Country	Studies by	Labour Demand			Labour Supply			
		Industry	Macro level	Occupation	Gender	Age	Education	Etnicity/ Race
Developed Countries								
European Countries								
Croatia	Bejaković & Mrnjavac (2014)						x	
Estonia	Merikull, Eamets, Humal & Espenberg (2012)			x			x	
France	Fernández, López &Pérez (2010)	x						
Germany	Fuchs, Sohnlein, Weber & Weber (2018)				x	x		
	Gebhardt, Grimm & Maria (2015)			x				
	Hinz & Logeay (2006)		x					
	Lehmann, Robert, Wohlrabe & Klaus (2016)	x						
	Maier & Afentakis (2013)			x				
	Maier, Mönnig & Zika (2015)	x	x	x				
	Maier, Neuber-Pohl, Mönnig, Zika & Kalinowski (2017)			x				
	Weber & Zika (2016)	x						
Latvia	Dubra & Gulbe (2008)	x		x				
Netherlands	Cörvers & Hensen (2004)			x			x	
	Willems (1996)	x		x			x	
Portugal	Goncalves & Seward (2019)			x				
Russia	Korovkin (2013)	x		x				
	Potekhina, Shulinina, Kuzmina, Potalisina & Sannikova (2016)			x				
Spain	Barnichon & Nekarda (2012)		x					
	Oberhofer, Blien & Tassinopoulos (2000)			x			x	
	Otero, Martin, Trujillo &Fernhdez (1992)	x			x			
Switzerland	Maitah, Toth, Kuzmenko, Srédl, Rezbová & Sánová (2016)		x					
United Kingdom	Bosworth, Jones & Wilson (2008)				x	x	x	
	Dainty & Edwards (2003)				x		x	
	Joshi & Overton (1988)				x	x		
	Saridakis & Papaioannou (2017)		x					

European Union	Loichinger (2015)				x	x	x	
East Asian Countries								
Hong Kong	Chan, Chiang, Mak, Choy & Wong (2006)	x		x				
	Sing, Love & Tam (2012)			x		x		
South Korea	Cohen (1988)	x		x			x	
	Kim (2012)				x	x		
Middle East								
Bahrain	Alsultanny (2013)			x				
North American Countries								
Canada	Shannon & Kidd (2001)				x	x		
	Thomas (2015)	x		x			x	
United States of America	Naiken & Schulte (1976)	x						
	Neumark, Johnson & Mejia (2013)						x	
	Maki (1981)	x						
	Pencavel (1986)					x	x	x
	Pfann (2001)				x		x	x
	Rickman & Steven (2003)	x						
	Stagliano & Stiner (1985)				x		x	
Oceania Countries								
Australia	Adams, Dixon, McDonald, Meagher & Parmenter (1994)	x	x	x				
	Meagher, Adams & Horridge (2000)	x	x	x				
	Meagher & Pang (2011)	x	x	x				
	Wong, Chan & Chiang (2004)	x						
New Zealand	Claus & Claus (2002)		x					
OECD Countries	Barro & Lee (2001)				x	x	x	
SouthEast Asian Countries								
Singapore	Kim (2012)				x		x	
Developing Countries								
East Asian Countries								
	Cao, Ho, Hu & Jorgenson (2020)					x	x	

China	Kim (2012)				x		x	
	Wang (2014)				x		x	
Southeast Asian Countries								
India	Kim (2012)				x		x	
Indonesia	Agusalim (2016)	x						
Malaysia	Kim (2012)				x		x	
Pakistan	Cohen (1988)	x		x			x	
	Kim (2012)				x		x	
Philippines	Kim (2012)				x		x	
Taiwan	Kim (2012)				x		x	
Thailand	Kim (2012)				x		x	
Vietnam	Kim (2012)				x		x	
South American Countries								
Colombia	Cohen (1988)	x		x			x	

3. Modeling Approach

Manpower Projection and Assessment Tool (MPAST) modeling system are divided into two sides, one side dealing with labor demand and the other side dealing with labor supply. This division is represented in Figure 2 by the dashed line, with labor demand modeled above the dashed line; and labor supply modeled below the dashed line.

Figure 2. MPAST modelling system

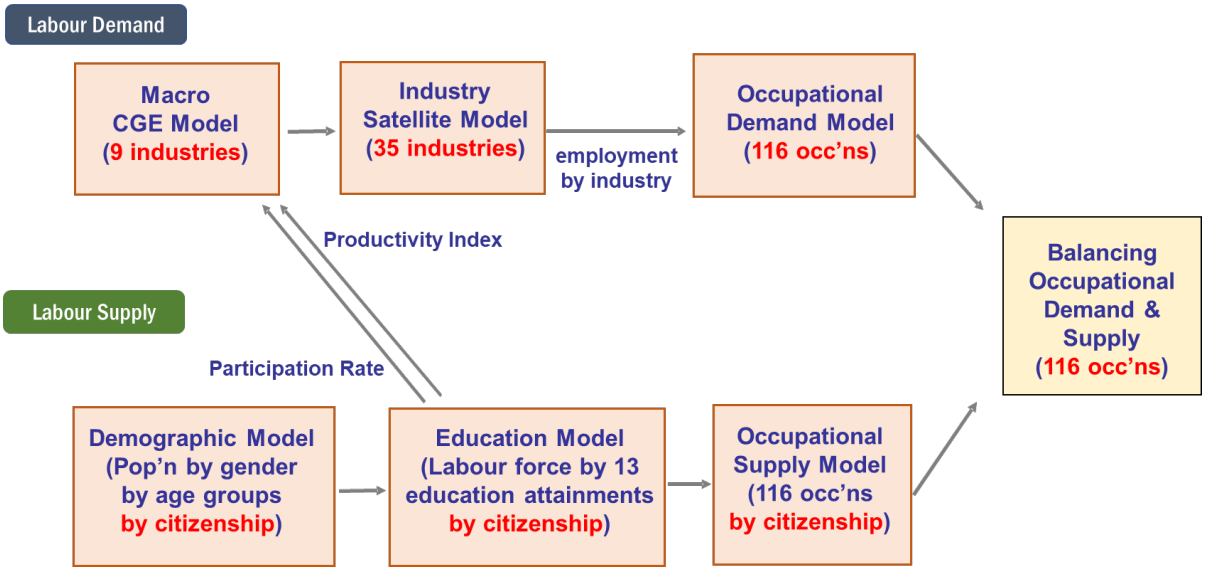
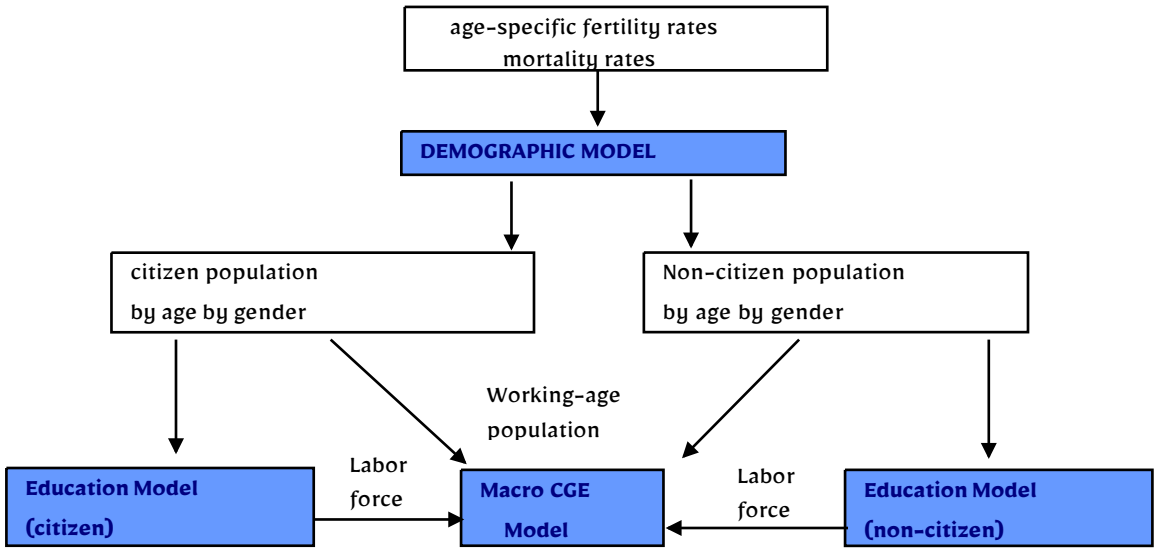


Figure 3. Demographic Model



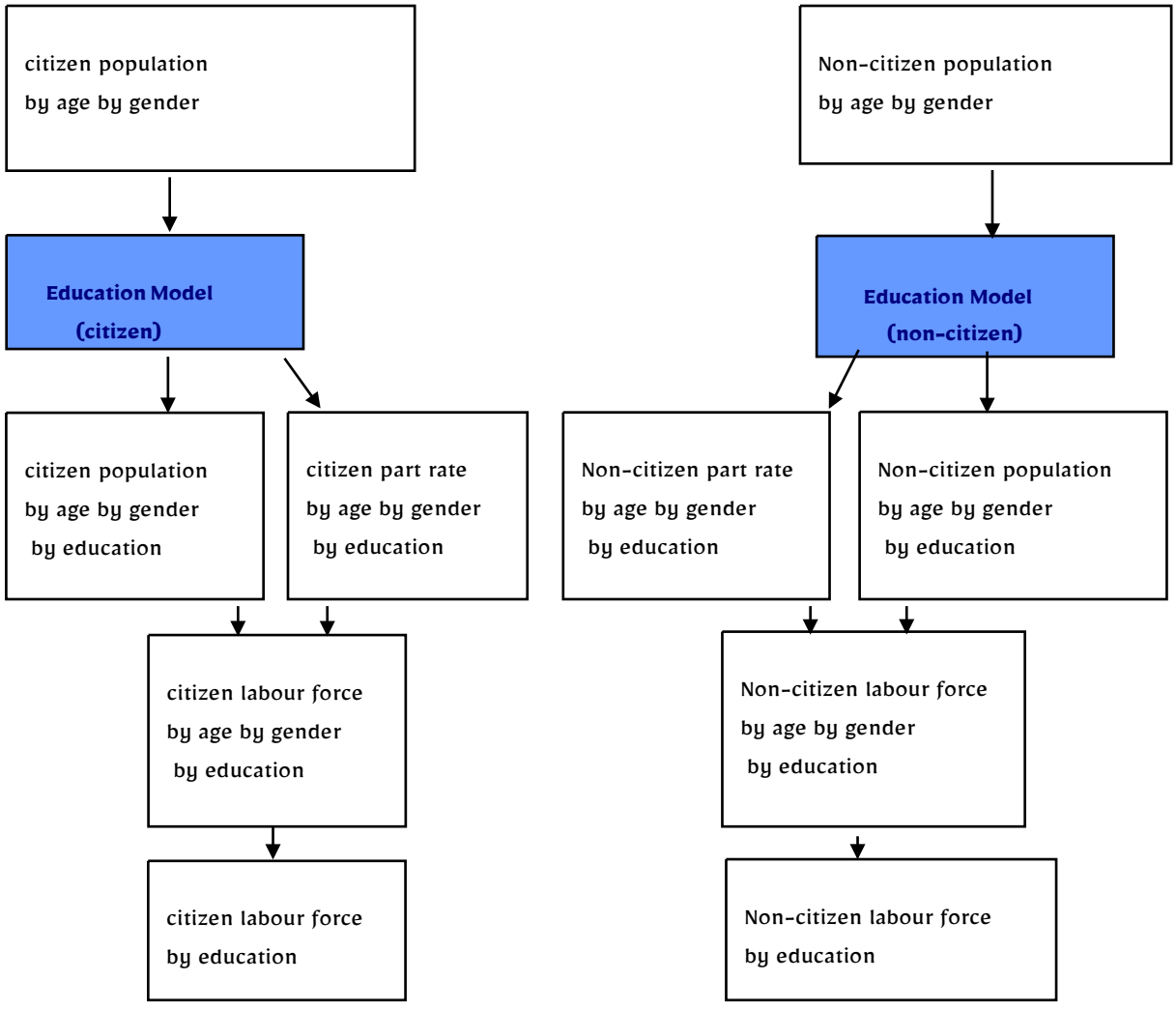
Labor supply is modeled in three models, each of which is shown in the bottom half of Figure 2. It has separately for citizens and non-citizens, so each model has two parts. The first model, demographic model, is used to project the population by age group and gender, with a citizen part and a separate part for non-citizens. In this model, assumptions are made about future fertility rates, mortality rates and non-citizen population to forecast the population. This modeled is based

on 5-year age groups projected forward at 5-yearly intervals using the cohort-component method. Under this method, every five-years age group is advanced to the next age group after allowing for mortality.

The second model, an educational attainment model, is used to project the labor force by educational attainment. There are separate parts to the model for citizens and non-citizens. In both parts, the same four steps are used to take the projections from demographic model of the population numbers in each age group/gender cohort and convert them to projections of the labor force by educational attainment:

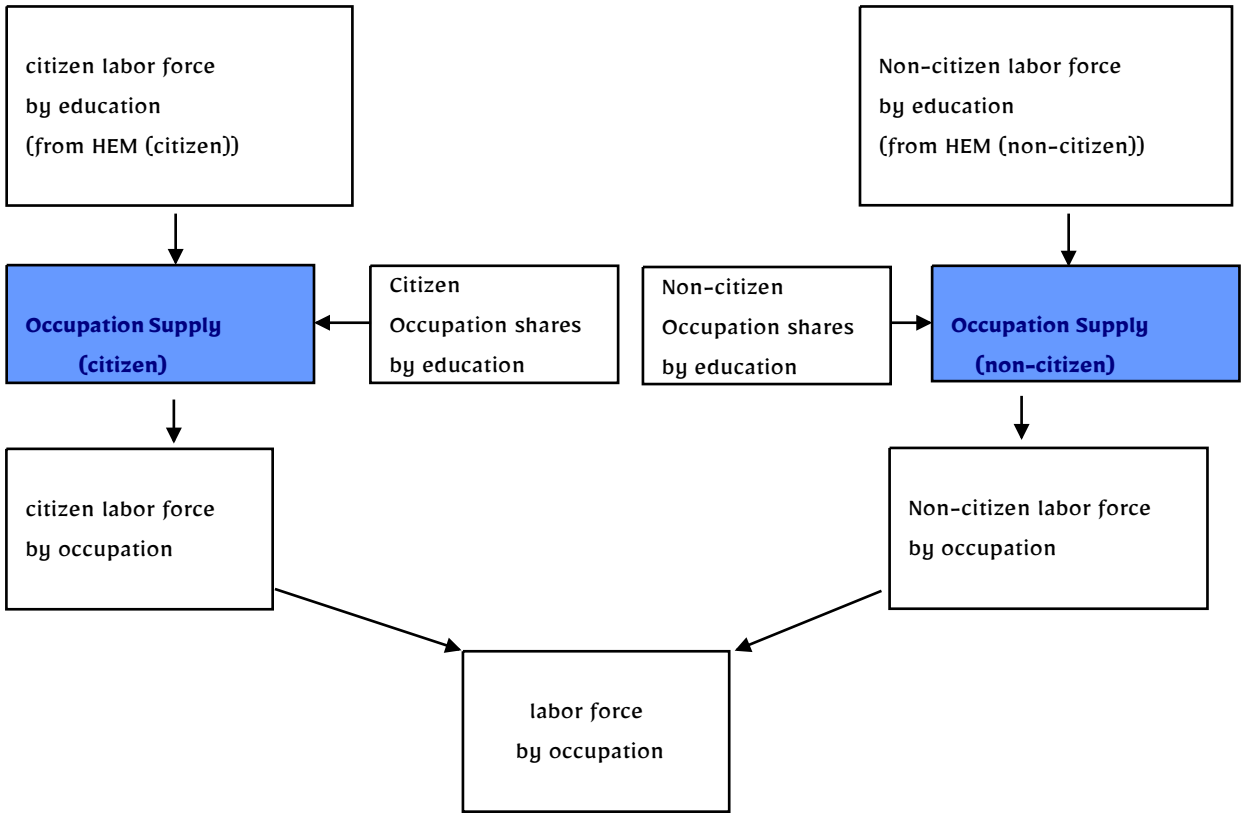
i. first, each of these cohorts is divided into 13 different levels of educational attainment, giving age group/gender/educational attainment cohorts;
ii. second, labor force participation rates are projected for each of these detailed cohorts;
iii. third, these participation rates are then applied to the associated cohorts to project the labor force by age group/gender/educational attainment; and
iv. finally, these projections are converted to the key output of the labor force by the 13 levels of educational attainment – this is achieved by aggregating over age groups and genders.

Figure 4. Education Model



The third model is an occupational supply model. This model converts the projection from education attainment model to a projection of the labor force by occupation. This is undertaken separately for citizens and non-citizens. The projections for citizens and non-citizens are then added together to arrive at a final projection for the total labor supply by occupation.

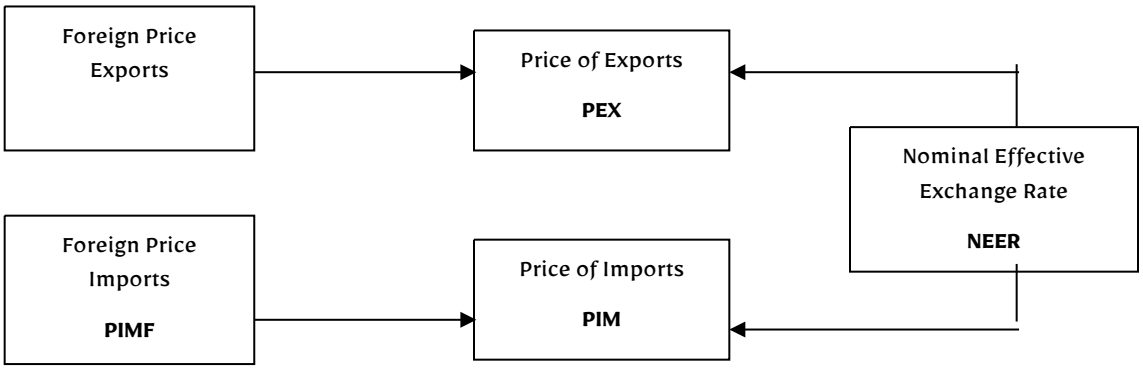
Figure 5. Occupation Supply Model



Labor demand is the remaining modelled in three models, as shown in the top half of Figure 2. The macro-CGE model is used to project labor demand by 9 broad industries, following the industry classification used in the national accounts. The macro-CGE model can be developed to 35 finer industries in the fifth model, industry satellite model. The sixth model, an occupational demand model, is used to convert the forecasts of labor demand by detailing industries to labor demand by occupation. In this model, employment by occupation is forecast using the industry forecast from the macro-CGE model and industry satellite model.

Figure 6. Macro CGE model

1. External Prices



2. Labour market

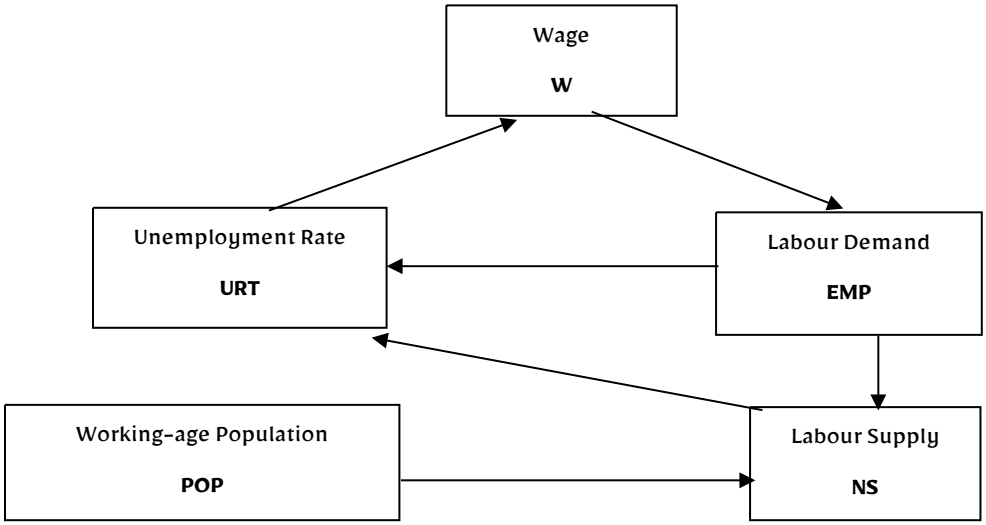
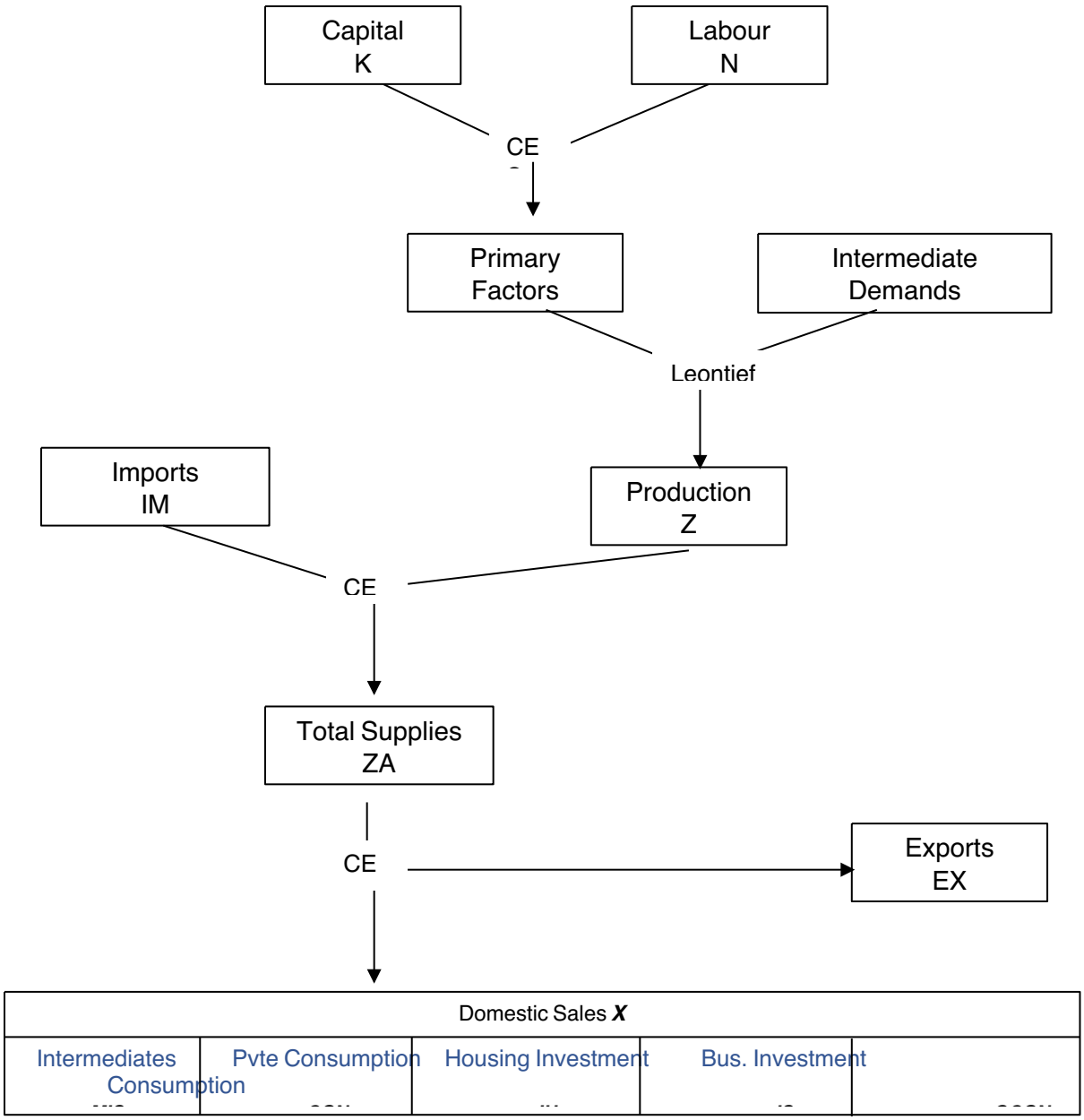
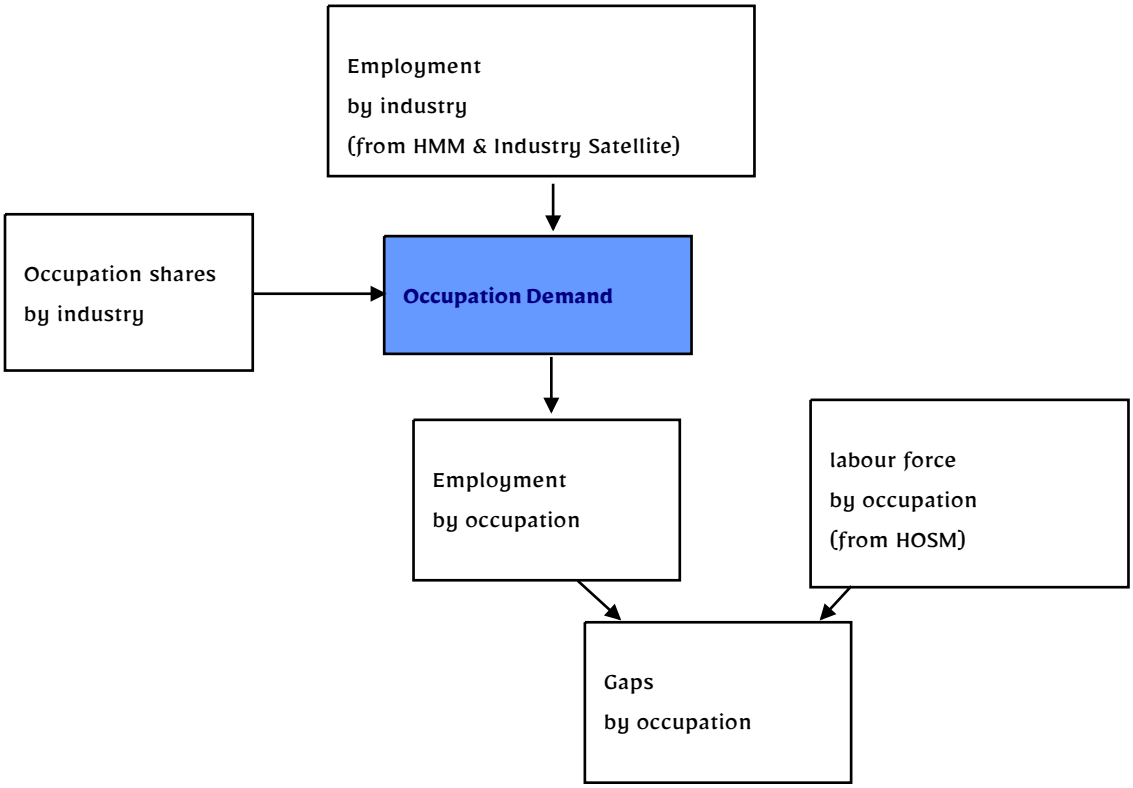


Figure 7. Industry component of macro-CGE model



The final model in the MPAST modeling System is Balancing Occupational Supply and Demand. The balancing takes the labor demand and supply predictions from the third and sixth models, respectively and identifies any structural shortages and surpluses for labor markets for each occupation.

Figure 8. Occupation Demand Model



4. Selected Key Baseline Results

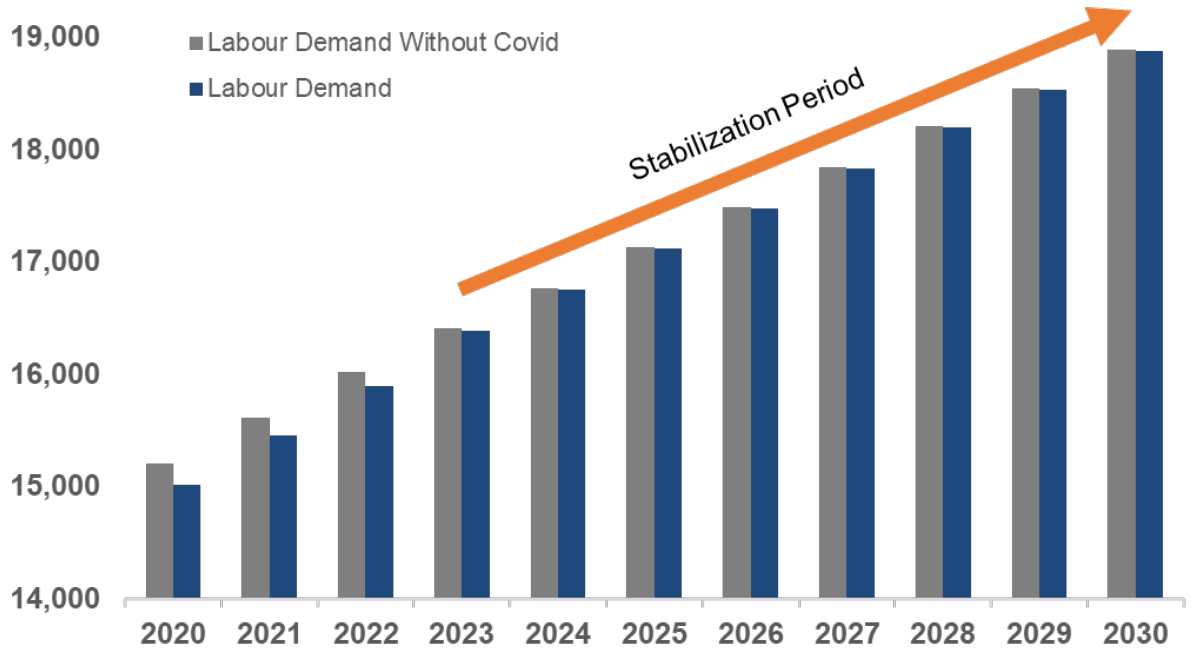
Results are generated based on a baseline or business-as-usual basis to which there is no further intervention made in adjusting the labor market environment. Therefore, the result would reflect the anticipated situation of the labor market by 2030 in the absence of rigorous policy response. However, the effect of Covid-19 has been incorporated into the model to portray the reality that conditioned the economy and labor market recoveries. Our model can be used to predict a "what shall happen" scenario in 2030, where the policy makers can take these results to formulate relevant interventions as remedies to cure the wounds.

Assuming recovery phases are continuous without further pharmaceutical measures to contain Covid-19 virus, the economy is healing up and that induces more job creation in the economy. Therefore, labor market restoration shall move in the same direction as well, implying a stable unemployment rate. Before looking further on the recovery pathway, MPAST simulation could shed some light in providing answers to ***how severe Covid-19 disrupts the labor market?***

Labor demand had been weighed down during the pandemic era. At an aggregate level, comparative projection with and without Covid-19 pandemic is glaring for the first 3 years of projection (2020-2022) to explain the period of labor market recovery (see Figure 9). The stabilization period is anticipated to take place from 2023 onwards. Despite showing a promising trend in the stabilization period, the Covid-19 pandemic still has a long-term impact on the aggregated labor demand.

According to the MPAST projection, the impact of Covid-19 pandemic has lowered the aggregate labour demand projection in 2030 at least by 0.05% compared to the projection without the presence of Covid-19 pandemic.

Figure 9. Comparative Analysis of Covid-19 Pandemic Existence on Labor Demand Projection at Aggregated Level, 2020-2030 ('000)



High-skilled workers were hardly displaced from pandemic-led job market disruption with prolonged effects. Figure 10 provides information of MPAST assessment on labor demand projection by skill with and without Covid-19 pandemic. In general, the existence of Covid-19 pandemic has induced more semi-skilled and low-skilled occupation demand but at the expense of reducing high-skilled occupation demand for at least 10 years.

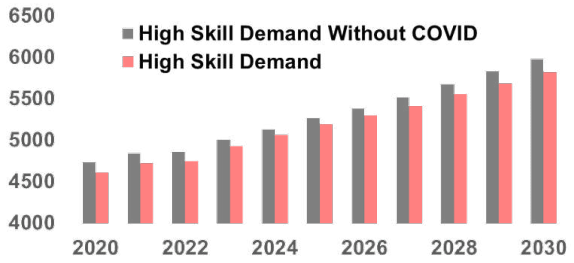
In detail, the reduction in high-skilled occupation is led by Legislators, Senior Officials and Managers, followed by Professionals, and Technicians and Associate Professionals at the end of 2025 projection year. It is also expected that a prolonged post-pandemic effect will keep these high-skilled occupations on a negative growth path until the end of 2030, particularly for the Professionals.

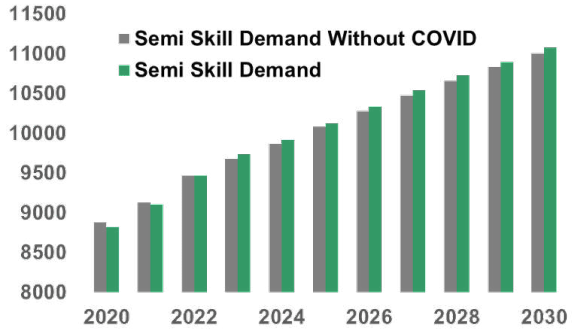
Faster recovery in the semi-skilled demand confluents with occupation shifts. The expansion of demand for the semi-skilled occupation during post-Covid-19 pandemic is expected to show a faster rebalancing after 2022. However, the benefit of this demand growth is not well-disseminated across occupations. Only Skilled Agriculture and Fishery Workers and Plant and Machine operators and Assemblers experience an upward trend, while the rest of occupation, especially Service Workers and Shop and Market Sales Workers bundle up for consecutive demand reduction for both projection periods.

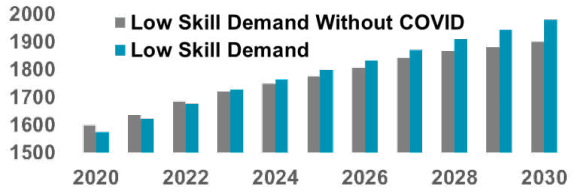
Interestingly, Skilled Agricultural and Fishery Workers are depicting a higher growth in 2030, suggesting a higher demand for these job categories. It portrays a shift for the next 10 years,

where current collective efforts and policies in the sector shall prove some positive transition in agricultural-based production.

Figure 10. Comparative Analysis of Covid-19 Pandemic Existence on Labor Demand Projection at Skill Level, 2020-2030







Implication on High Skill Occupation by Rank

2025	2030
↓ Legislators, Senior Officials and Managers	↓ Professionals
↓ Professionals	↓ Legislators, Senior Officials and Managers
↓ Technicians and Associate Professionals	↓ Technicians and Associate Professionals

Implication on Semi Skill Occupation by Rank

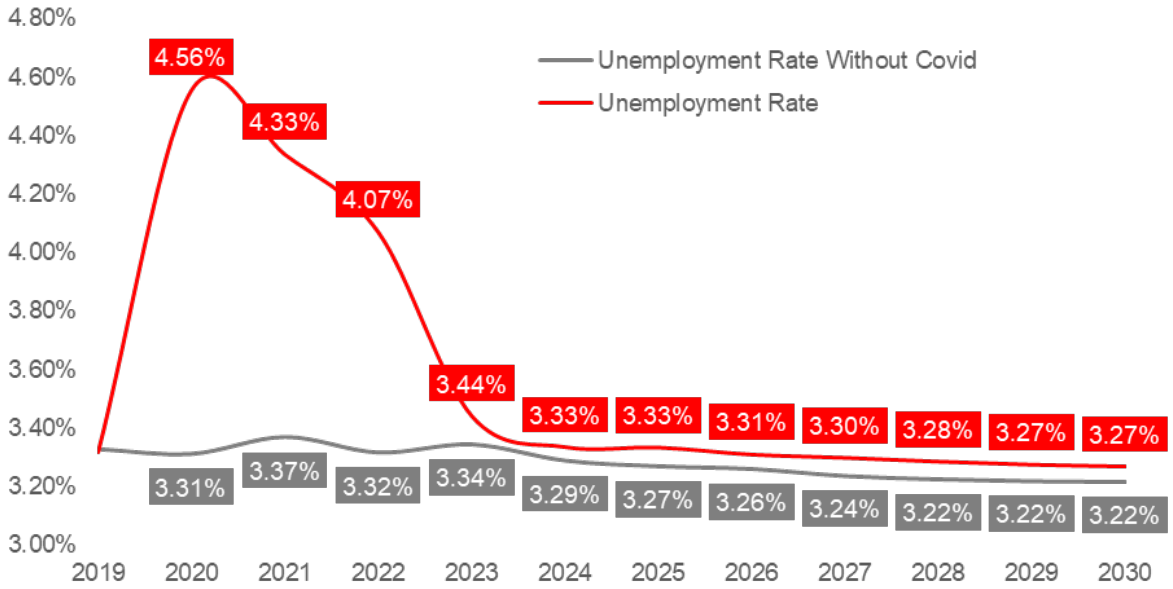
2025	2030
↓ Service Workers and Shop and Market Sales Workers	↓ Service Workers and Shop and Market Sales Workers
↓ Craft and Related Trades Workers	↓ Craft and Related Trades Workers
↓ Clerical Workers	↓ Clerical Workers
↑ Skilled Agricultural and Fishery Workers	↑ Plant and Machine-operators and Assemblers
↑ Plant and Machine-operators and Assemblers	↑ Skilled Agricultural and Fishery Workers

Implication on Low Skill Occupation by Rank

2025	2030
↑ Elementary Occupations	↑ Elementary Occupations

Continuous recovery potentially concedes to the 12MP unemployment rate target. The Covid-19 pandemic has derailed Malaysia's normal unemployment rate in 2020, where it jumped to 4.56%, the highest since the last two decades. As the economy and labor market are in the recovery phase, MPAST forecasts that the unemployment rate in 2021 and 2022 would show promising trends to drop to 4.33% and 4.07% for the respective year. Meanwhile, the year 2023 is expected to be the last year to record more than 3.4% unemployment rate along the projection periods, signaling a normal full employment state. However, the unemployment rate trajectories for the following years are predicted to border between 3.27% and 3.33% in the existence of Covid-19 long-term effect (see Figure 11).

Figure 11. Comparative Analysis of Covid-19 Pandemic Existence on Unemployment Rate Projection, 2020-2030 (%)



Future labor market shows strong growth in the aggregate manner, where the labor demand and supply are moved in tandem to impose a stable unemployment rate until 2030. MPAST projection shows that labor demand is a bit higher in the first five years (2020-2025), growing at 2.66%, and would then grow steadily for the successive five years (2025-2030) at 1.97% (see Figure 12). However, a slight labor market imbalance is expected during the first periods when the labor supply growth rate is projected at 2.40%. This trend is anticipated in the midst of economic recovery during the post-pandemic as reflected by the corrective labor market intervention on the demand side. As the labor market stabilization continues, the growth of labor supply and demand is expected to be almost identical within 2025-2030, with 1.97% and 1.98% respectively, affirming the reinstatement of the pre-crisis unemployment rate.

Positive labor demand growth with higher post-pandemic recovery in all economic sectors. Figure 13 provides findings on the projection of labor demand by 5 main sectors. It is expected that all economic sectors would show positive demand growth for the next 10 years. Knowing that post-pandemic economic recovery is underway, the growth of labor demand is predicted to be higher within 2020-2025, as compared to the stabilization s after year 2025. This trend implies that the economic sectors are somewhat responsive to restore business growth that hasten higher labor demand. At the sectoral level, the Services sector would continue to create more jobs as reflected by its highest contribution to the national income. Meanwhile, the Mining and Quarrying sector is expected to chart a greater labor demand growth between 2025-2030. The trend is, however, aligned to the previous employment growth of the sector that grew around 3% on average annually for the last 10 years.

Figure 12. Aggregated Labor Market Projection, 2021-2030

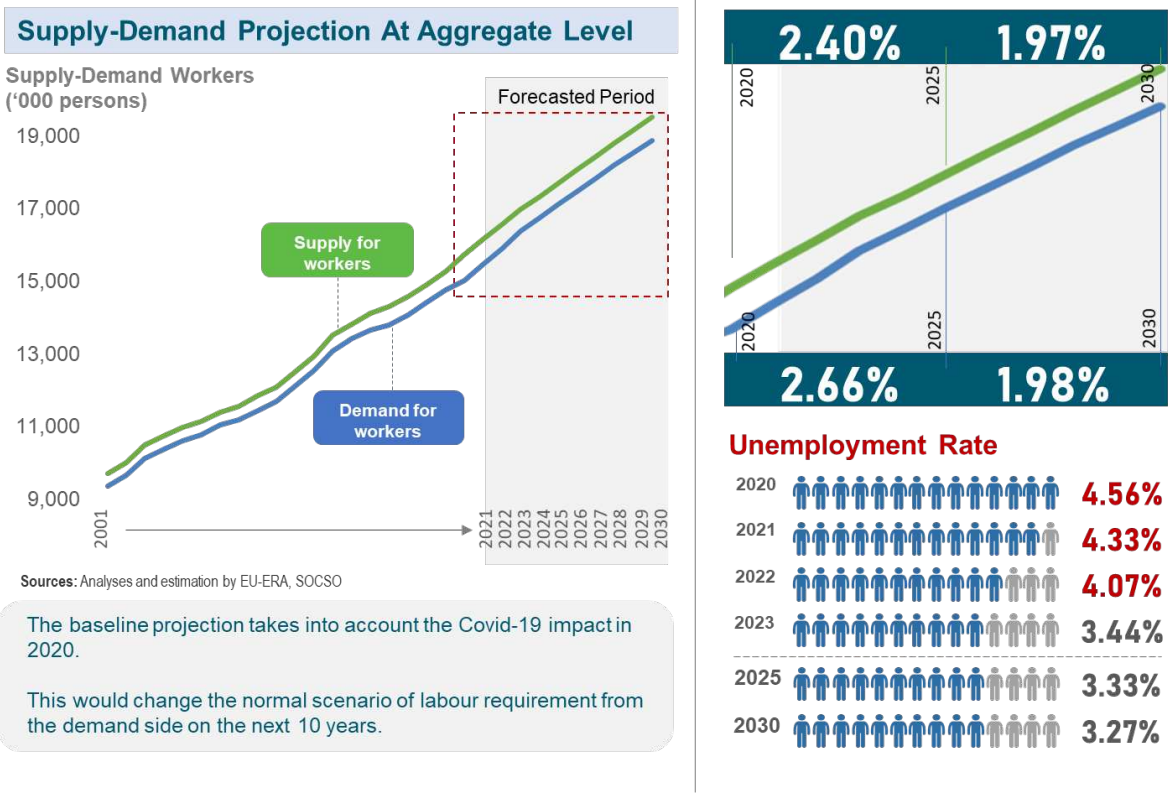
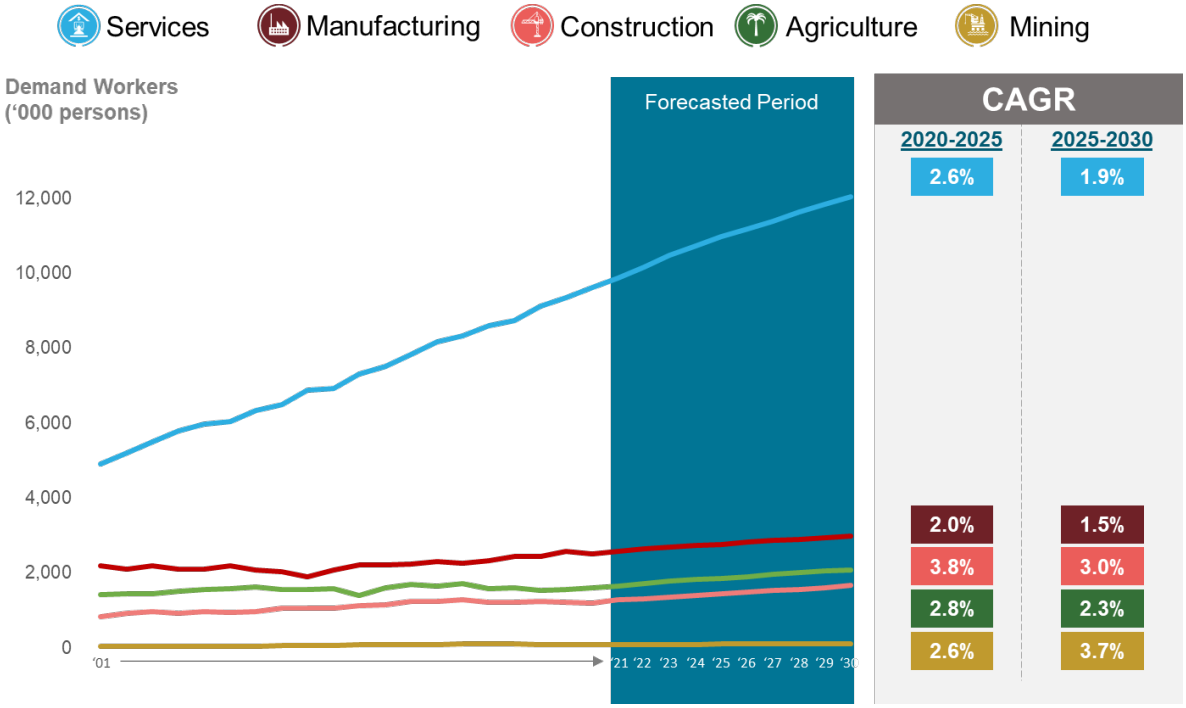


Figure 13. Sectoral Projection for Labour Demand ('000 persons)



Sectoral demand for labor induces changes in the skill composition reflecting a pattern of skill shift. The growth of labor demand by the economic sectors does not only suggest the

stabilization of the labor market, but also indicates a pattern of change in the skill composition. As illustrated in Figure 14, MPAST projects that the Agriculture sector would demand for more high-skilled workers, which is anticipated to increase by 0.9% between 2025 and 2030. Although the compositions of semi- and low-skilled workers are still higher compared to the high-skilled ones, both of the former skill categories are expected to decline in their total shares. Meanwhile, baseline projection also indicates mild skill composition change for the Manufacturing sector suggesting that in spite of positive growth on demand for labor in the sector, the skill requirement within the sector is unlikely to depict a significant shift for a higher skill level. However, in the virtue of technological upgrading, the Services sector, which has higher innovation absorption capacity, seems to demand more high-skilled labor by 2030 and that also signals for less low-skilled workers in the sector.

Figure 14. Sectoral Labor Demand by Skill, 2025 & 2030

	2025			2030		
	High Skill	Medium Skill	Low Skill	High Skill	Medium Skill	Low Skill
Services	39.0%	49.4%	11.6%	39.6%	49.0%	11.4%
Manufacturing	26.4%	66.0%	7.6%	26.3%	66.1%	7.5%
Construction	25.6%	52.3%	22.0%	27.5%	49.7%	22.8%
Agriculture	8.7%	77.0%	14.3%	9.6%	74.5%	15.9%
Mining	33.1%	50.8%	16.1%	33.3%	50.7%	16.0%

Note: Skill categories were classified using MASCO where High Skill covered occupation category 1-3, Semi Skill covered occupation category 4-8 while Low skill covered occupation category 9.

5. Concluding Remarks

From the analysis presented in Section 4, this section highlights important takeaways that are portrayed based on the MPAST baseline projections. The baseline results show that the labor market issue remains unsolved. Despite the MPAST projection limit to the labor requirement and labor supply assessment and did not cover the mismatch topic, the analysis shows that the current and projection trend is identical to presume the mismatch issue remains untouchable. In detail, the lack of job offered for high skill followed by the uncontrolled high-skill labor supply create the labor surplus among the high-skilled. Meanwhile, the low-skilled and semi-skilled occupation were shortage of labor in the future labor market to strengthen our argument of unsolved mismatch issues.

To become a high-income nation by 2030, economic transformation is the strongest enabler to accelerate skill-based demand that promotes high-skills employment. Based on the findings, it is estimated that a high-skilled labor surplus is protracted until 2030, though at a diminishing rate. Whilst the Services sector seems to be steadily creating more jobs, proactive macroeconomic intervention through aggregate demand and supply stimuli shall be emphasized to support economic transformation. Accelerating economic transformation to boost skill-based demand is the key policy intervention to change the economic structure. Ensuring high-skilled job creation through quality investment and productivity nexus, and facilitating digitalization and innovation in strengthening knowledge-intensive production for higher-value production are among the policy interventions to be considered.

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