

TPPA perspective: Economic Indicators of Penang

Section summary

- Penang 's heritage is built on its being a melting pot of cultures and religions, and the importance of its electrical and electronics (E&E) sector making it the Silicon Valley of the East.
- Penang has a slightly aging demographic, with a similar proportion of Malays and Chinese.
- Malaysia's economic structure is more diversified but less focused than Penang. Penang has outpaced Malaysia's GDP growth rate in 2014.
- Small and medium enterprises (SMEs) are a major contributor to Malaysian GDP, particularly SMEs in the agriculture sector. For Penang, textile, E&E, plastics and wood SMEs are expected to benefit from the Trans-Pacific Partnership (TPP).
- The Trans-Pacific Partnership Agreement's (TPPA) impact on Penang's trade balance depends primarily on its influence on Penang's present and future trade relations with TPP countries, particularly its major trading partners, the United States (US), Japan, Singapore & Vietnam.
- Singapore, US and Japan are major foreign direct investment (FDI) investors in Penang, focusing in the E&E sector although with different magnitudes.
- US and Japan have the highest number of patents in force among TPP countries. Both countries have disproportionately higher number of patents in all technology categories, especially Category I (Electrical Engineering). Malaysia is ranked 8th among the 11 TPP nations for number of patents in force. Local residents own less than 10% of all patents registered in Malaysia.
- Penang has had a consistently lower unemployment rate than Malaysia, but Penang's labour force participation rate declined in recent years. Malaysia has been facing an influx of foreign labour, which depresses demand for skilled labour in the manufacturing sector.
- Foreign visitors to Penang have increased due to Penang's function as the gateway to industrial areas, healthcare and UNESCO World Heritage status.
- Penang has experienced growth in volume of housing units alongside a decline in population growth rate and household size.

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1. Background

Located north of Peninsula Malaysia, the state of Penang, is Malaysia's second smallest state. Penang has the highest population density among Malaysian states ($1,490/\text{km}^2$)¹, with a population of 1.69 million (2015) and an area of $1,048\text{km}^2$. Penang shares borders with two Malaysian states, Perak and Kedah. It consists of 5 administrative districts two on the island and three on the mainland. Penang is a highly urbanised state, with the third highest percentage of urbanization rate of 80% (2010)², behind Kuala Lumpur (100%) and Selangor (89.1%).

In 2008, Penang's capital, George Town, was jointly listed as a UNESCO World Heritage Site with Malacca, propelling its tourism industry to the forefront of the Penang identity. The island was established in 1786 by Francis Light, its history as a commerce and cultural hub built along a long history of trading. In later decades, Penang was part of the Straits Settlements with Singapore and Malacca, linked by their common status as open economies and free ports. A large part of the historical significance of Penang can be attributed to it being a melting pot of various cultures and religions, creating fertile ground for the development of their tangible and intangible heritage elements.

Penang's economic structure is highly manufacturing- and services- oriented; particularly, the prominence of its electronics and electricals (E&E) sector, with operations primarily in the Bayan Lepas and Seberang Prai Free Industrial Zones, has led to its being labelled the 'Silicon Valley of the East'. MNCs from the US, Germany, Netherlands and Taiwan have set up operations in Penang, many of which are E&E firms, e.g. Osram, Intel, Toshiba etc. Recently, MNCs have set up shared services and outsourcing (SSO) operations in Penang, e.g. AirAsia, Citibank etc.

Penang is a member province of the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT), being included in 2 IMT-GT economic corridors, namely the Trang-Satun-Perlis-Penang-Port Klang-Malacca corridor and the Songkhla-Penang-Medan corridor³. It is also part of the 2.4mil ha Northern Corridor Economic Region (NCER), which consists of four states and 21 districts, collectively contributing a fifth of Malaysia's GDP⁴.

¹ Saw, SH (2015), 'The Population of Malaysia'; DOSM
Kuala Lumpur has a population density of $6,696/\text{km}^2$, but is technically a federal territory, not a state of Malaysia.

² Population and Housing Census 2010, DOSM

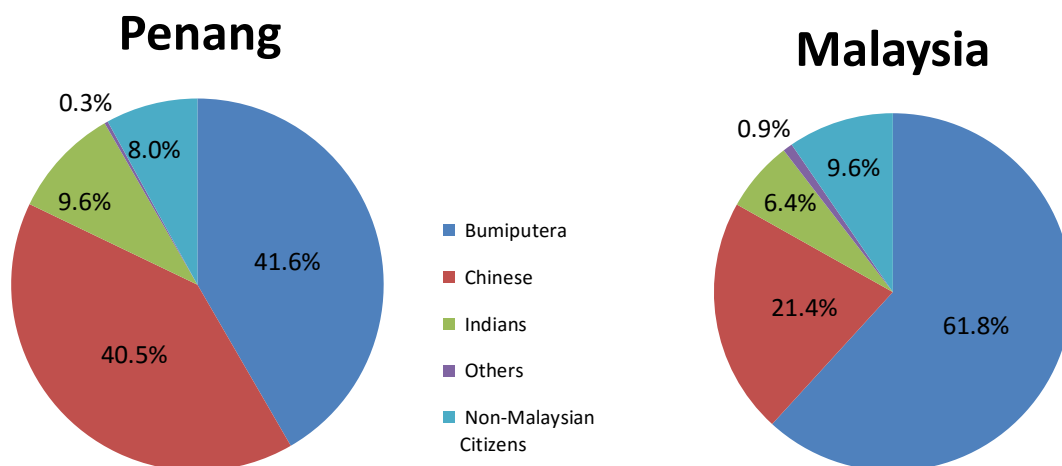
³ <http://www.imtgt.org/Documents/Studies/Logistics-Development-Study.pdf>.

⁴ <http://siteresources.worldbank.org/INTCHD/Resources/430063-1310571283698/MalaysiaBBL2.pdf>

2. Demographics

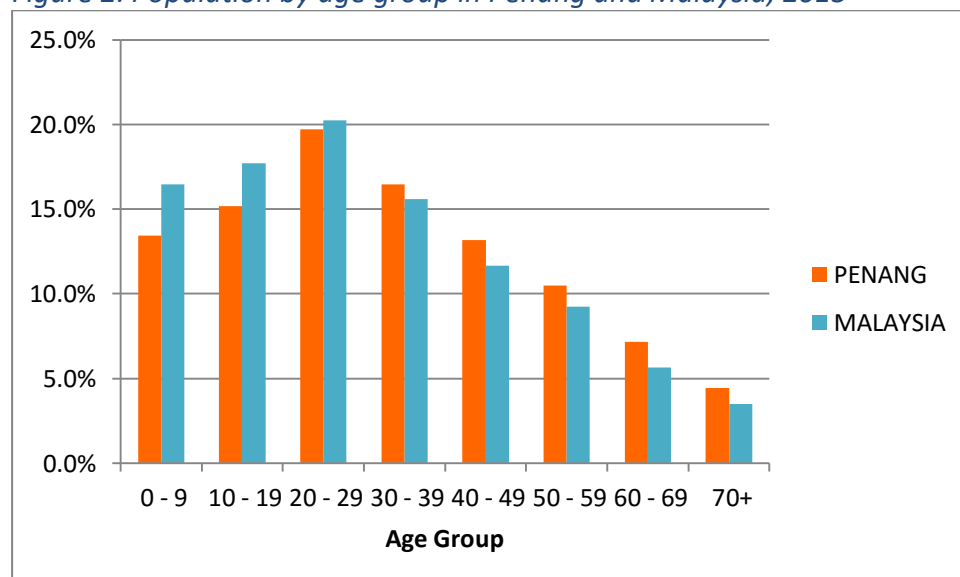
Penang has a similar proportion of Chinese (40.5%) and Bumiputera (41.6%) population (Figure 1) with a slightly larger proportion of Bumiputera, in contrast with the national ethnic composition where the Bumiputera are a clear majority (62%). Penang features a slightly more aging demography with higher proportions of senior citizens aged 50 and above (22.0%), compared to Malaysia (18.3%). However, Penang has greater proportions of productive youths and adults in the 20-49 age groups (49.4%) compared to the national average (47.5%; Figure 2), hence larger workforce population.

Figure 1: Population by ethnic group in Penang and Malaysia, 2015



SOURCE: DEPARTMENT OF STATISTICS MALAYSIA (DOSM)

Figure 2: Population by age group in Penang and Malaysia, 2015



SOURCE: DEPARTMENT OF STATISTICS MALAYSIA (DOSM)

2. Economic structure & performance

2.1 Malaysia

Penang has outpaced Malaysia's GDP growth rate in 2014, and is estimated to continue to exceed Malaysia's in 2015, although it has closely followed Malaysia's GDP growth rate in the past 5 years (Figure 3). This is despite differences in the structure of the Penang economy versus Malaysia's. National-level data suggests Malaysia's economy is more diversified but less focused compared to Penang's manufacturing- and services-dominated economic structure (Figure 4). Like Malaysia, close to half of Penang's income is derived from services-related output, but the percentage of Penang's manufacturing output is almost double that of manufacturing-related national income. The services sector has experienced slight growth as a proportion of state output, and the manufacturing sector a slight gradual decline over the years, but sufficient such that services (48.1%, 2015) has overtaken manufacturing (46.3%, 2015) to make up the highest proportion of Penang's GDP, as shown in Figure 5. This reflects the growth of shared services and outsourcing (SSO) activities in Penang. The agriculture (2.3%), mining and quarrying (0.1%) and construction (3.2%) sectors are less significant, altogether contributing to only 5.6% (2014) of Penang's GDP (Figure 4).

PricewaterhouseCoopers (PwC)⁵ projects an increase in USD 107-211 billion in GDP over the period 2018-2027 for Malaysia, raising GDP by 0.60 - 1.15 percentage points. Reduction in nontariff measures (NTMs) is expected to be the main contributor to these gains. Non-participation in the TPP would result in an opportunity cost to growth⁶ of 0.62 – 1.18 percentage points in 2027. The E&E and plastics industries can expect output growth of 0.60 - 1.22 and 0.42 - 0.66 percentage points respectively in 2027. Growth in these industries, which form a significant part of Penang's manufacturing sector, would be expected to add to Penang's income.

Jomo (2015)⁷ however argues that the TPP's economic benefits are minimal compared to the risks that Malaysia's participation in the TPP entails, based on a UN Global Policy Model (UN GPM) analysis (unreleased). Banga (2015)⁸ questions the realism of the assumptions underlying the computable general equilibrium (CGE) analysis used by PwC and others. In addition, as exports involve a significant proportion of imports of intermediate products, Banga estimates 'domestic value-added trade' instead of trade per se as per PwC's CGE analysis. On the other hand, the UN GPM-based study headed by Jomo utilises a broader scope, accounting for the effects of the TPP on employment and inequality, and how these impact economic growth.

For Malaysia, Banga estimates a decrease in domestic value-added (DVA) exports by around USD17 bil, potentially resulting in a deterioration of net DVA exports from USD19 bil (2013) to USD37 bil per year. Hence, Banga argues that employment in export-oriented sectors will suffer. On the other

⁵ PwC (2015), 'Study on Potential Economic Impact of TPPA on the Malaysian Economy and Selected Key Economic Sectors'.

⁶ reduction in growth from scenario in which TPP is absent + forgone benefits that could have been gained from joining the TPP

⁷ Jomo, KS (2016), 'MPs our last defence from TPPA own-goal'.

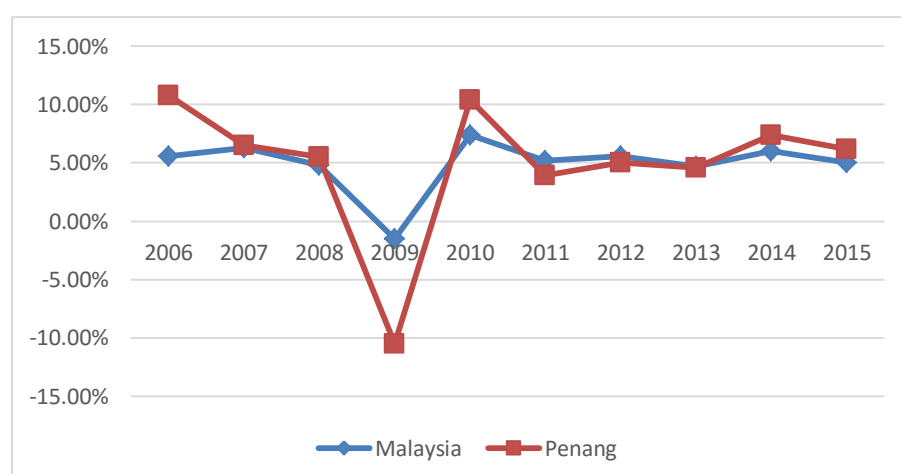
⁸ Banga, R (2015), 'Trans-Pacific Partnership Agreement (TPPA): Implications for Malaysia's Domestic Value-Added Trade

hand, the UN GPM estimates that some TPP participants will experience net GDP losses, whereas others will experience negligible gains over the course of 10 years⁹, in addition to employment losses of 771,000 across all TPP countries and increased inequality given the decreased share of national income for labour.

2.2 Penang

Table 1 shows that the top-performing sectors in Penang (ranked by growth rate of output) are mining and quarrying, construction, manufacturing and services (2014). Growth in Penang's agricultural (4.2%) and manufacturing (9.6%) sector have well exceeded the national average (2.1%, 6.2%), with the manufacturing sector in Penang recording a GDP growth rate of 3.4 percentage points above Malaysia. The growth rate of the services sector in Malaysia is similar to that of Penang (6.5%), whereas compared to Malaysia, higher growth rates are observed in Penang's construction (13.1%, 11.8%) and mining and quarrying (13.6%, 3.3%; 2015) sectors.

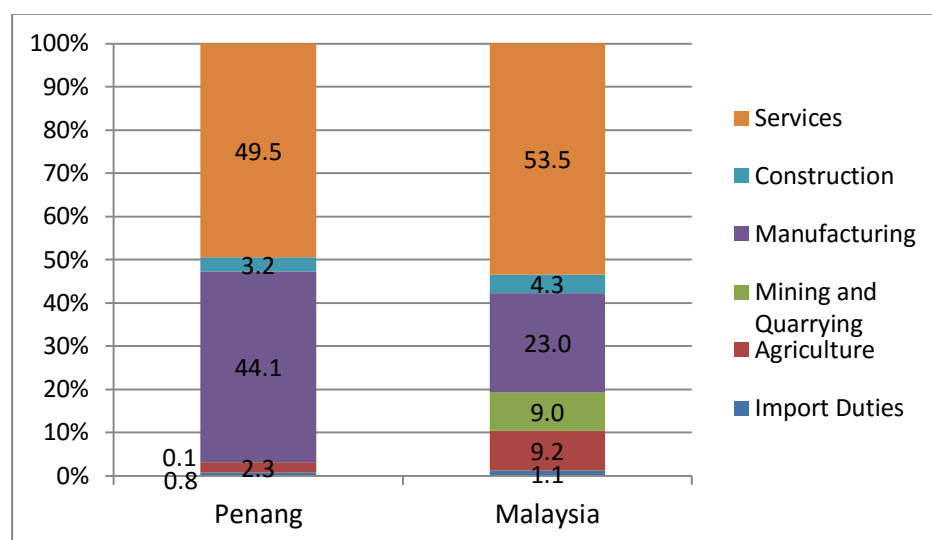
Figure 3: GDP annual growth rate in Malaysia and Penang, 2006-2015p



SOURCE: DOSM, PENANG INSTITUTE

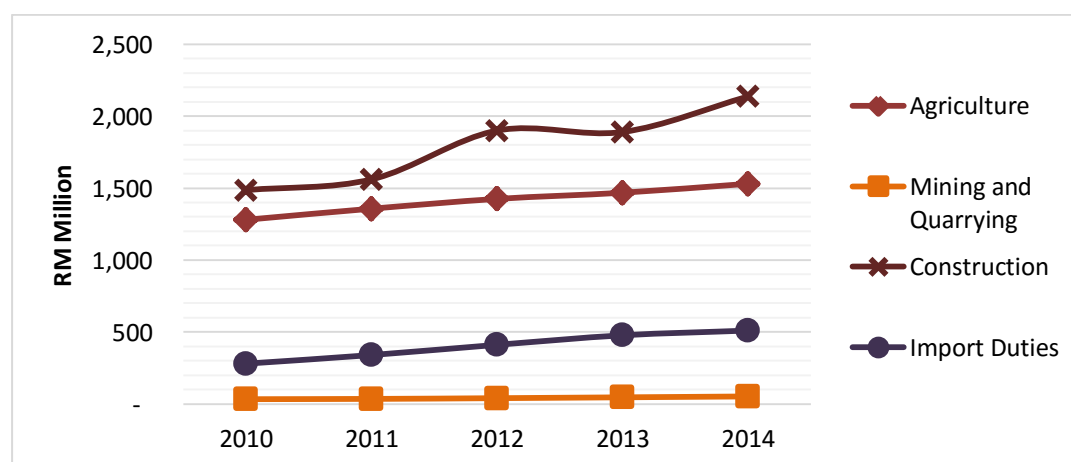
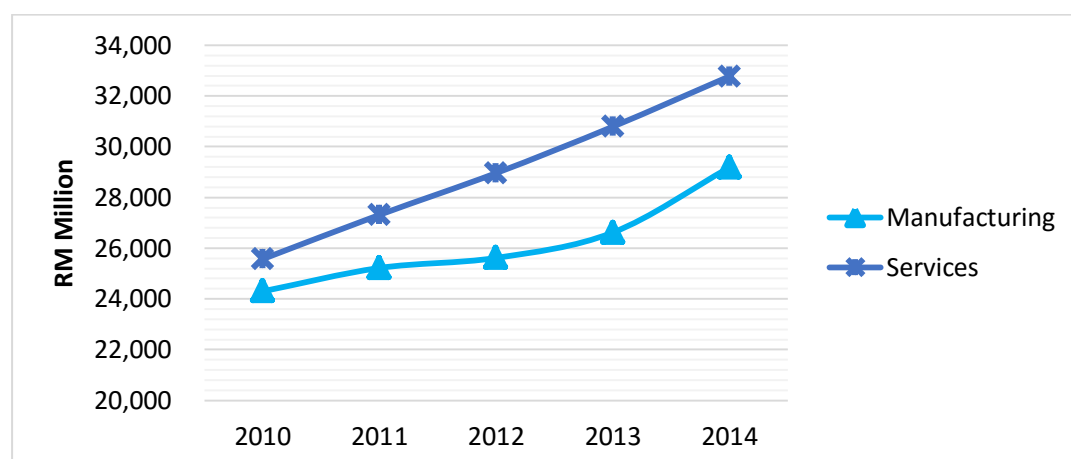
⁹ Less than 1% in gains for developed countries; less than 3% in gains for developing countries.

Figure 4: Economic structure by percentage share of GDP in Malaysia and Penang, 2014



SOURCE: DOSM

Figure 5: GDP by Kind of Economic Activity, Penang, 2010-2014



SOURCE: DOSM

Table 1: GDP growth rate (%) by sector in Malaysia and Penang, 2014

	Malaysia	Penang
<i>Agriculture</i>	2.1	4.2
<i>Mining and Quarrying</i>	3.3	13.6
<i>Manufacturing</i>	6.2	9.6
<i>Construction</i>	11.8	13.1
<i>Services</i>	6.5	6.5
<i>Import Duties</i>	10.1	6.8
<i>GDP growth</i>	6.0	8.0

SOURCE: DOSM

3. SME

SMEs contributed 35.9% (RM363.5 billion) of value added to the Malaysian GDP in 2014 (at constant 2010 prices). At the national level, SMEs are of greatest importance to the agriculture sector, their proportion of contribution of value added to the sector's GDP being the highest at 48.6%. This is followed by construction (47.9%), services (39.4%) and manufacturing (33.9%)¹⁰. 38% of SMEs are Bumiputera-owned, with greater proportions of SMEs in micro-sized SMEs as opposed to small and medium-sized SMEs (Table 2).

The breakdown of Penang SMEs does not reflect the divergence of Penang's economic structure from the national economic structure (Table 3). There is only a slightly greater proportion of Penang SMEs in the manufacturing category compared to Malaysia, despite Penang having double the proportion of manufacturing output compared to the national average.

The PwC report expects SMEs to gain overall from the TPP, although less compared to MNCs and large companies. Penang's 51 textile SMEs¹¹ can expect to be the biggest beneficiaries of the TPP amongst SMEs, in accordance with PwC's sectoral analysis¹² which estimates the largest positive impact on output for the textiles sector among the 10 sectors covered in its analysis. Also, Penang's 279 E&E, 210 plastics and 45 wood SMEs¹³ can expect to benefit from Malaysia's participation in the TPP.

¹⁰ Source: DOSM (2014)

¹¹ Source: SME Corp

¹² PwC (2015), 'Study on Potential Economic Impact of TPPA on the Malaysian Economy and Selected Key Economic Sectors'.

¹³ Source: SME Corp, author's calculations

Table 2: Number of SMEs in Malaysia by size and ethnicity

	Non-Bumiputera		Bumiputera ^p		Total
Micro	277,528	56%	218,930	44%	496,458
Small	102,753	80%	26,034	20%	128,787
Medium	16,916	85%	2,975	15%	19,891
Total	397,197	62%	247,939	38%	645,136

SOURCE: ECONOMIC IMPACT OF THE TRANS-PACIFIC PARTNERSHIP AGREEMENT, PWC

Table 3: Number of SMEs in Malaysia and Penang by category

	Malaysia		Penang	
	Number	%	Number	%
Agriculture	6,708	1.04%	269	0.66%
Mining and quarrying	299	0.05%	7	0.02%
Manufacturing	37,861	5.87%	2,614	6.40%
Construction	19,283	2.99%	1,035	2.54%
Services	580,985	90.06%	36,899	90.39%
Total	645,136	100.00%	40,824	100.00%

SOURCE: ECONOMIC CENSUS 2011, DOSM

4. Trade

4.1 Trade openness indicators

Table 4: Trade as percentage of GDP for TPP countries and Penang

	2011	2012	2013	2014
Penang	494	480	470 ^e	464 ^p
Malaysia	155	148	143	138
Australia	41	43	41	42
Brunei Darussalam	108	113	109	107
Chile	73	69	65	66
Singapore	376	368	360	351
Peru	55	52	49	46
United States	31	31	30	-
Mexico	64	67	65	66
New Zealand	60	-	-	-
Vietnam	163	157	165	170
Canada	62	62	62	64
Japan	31	31	31	31

SOURCE: WORLD BANK, DOSM, OWN CALCULATION (PENANG)

NOTE: PENANG GDP FIGURES FOR 2013 IS ESTIMATED; 2014 PROJECTED

Table 5: Open Markets Index (OMI) 2015 scores and rankings for TPP countries

	Category	Rank	Overall score	Trade policy regime
Malaysia	2	33	4.0	4.5
Australia	2	27	4.1	4.7
Chile	2	29	4.1	4.3
Singapore	1	1	5.5	5.8
Peru	3	40	3.8	5.1
United States	3	42	3.7	4.8
Mexico	3	54	3.1	3.3
New Zealand	2	21	4.3	5.3
Vietnam	3	45	3.6	3.4
Canada	2	24	4.2	4.6
Japan	3	44	3.6	4.9

SOURCE: INTERNATIONAL CHAMBER OF COMMERCE

NOTE: BRUNEI IS NOT RANKED

An indication of the importance of international transactions relative to domestic transactions¹⁴ is given by the openness index (Table 4), defined as the percentage of trade (sum of imports and exports) as a fraction of GDP. By this measure, international transactions are of greater importance to Penang¹⁵ than they are to Singapore, which has the world's third highest openness index after Hong Kong and Luxembourg. The openness index could be misleading if used as a measure of the level of trade barriers, as a low ratio could mean that high trade barriers deter others to trade with that country, but could also mean that the economy in question is small in size. A more reliable measure of trade barriers is important to ascertain the extent to which gains can be made from a free trade agreement such as the TPP.

The International Chamber of Commerce maintains an Open Market Index (Table 5), which scores countries according to the following criteria: observed openness to trade, trade policy, foreign direct investment (FDI) openness and infrastructure for trade. Category 1 countries are the most open, whereas Category 2 countries are of above average openness followed by Category 3 which includes countries of average openness. Higher scores indicate greater ease of access to an economy. The index corroborates our assertion implied in the preceding paragraph that Singapore is a very open economy, with high scores in all the aforementioned components of the Index. While the United States and Japan are categorised as countries of average openness, they record high scores in trade-enabling infrastructure.

However, it is useful to narrow down to the trade policy regime component of the index, which provides scores for the tariff and non-tariff barriers imposed by these countries. All countries in the TPP included in the sample record scores above 3.7 (the average score within the ICC's sample) except for Mexico (3.3) and Vietnam (3.4). This indicates that the trade policies of most TPP countries are relatively liberal even in the absence of the TPP. Hence, as a free trade agreement, the expected gains from the TPP would be limited.

4.2 Penang trade indicators

Monthly trade data¹⁶ (Figure 6) shows that Penang recorded trade surpluses since January 2005 for most months except March 2008 and August and October 2014, peaking in May 2008 at RM8.1 mil. This suggests that Penang is a net exporter to the rest of the world. Collectively TPP partners contributed RM108.8 bil (37.1%) to Penang's trade volume in 2013, with RM53.4bil in exports and RM55.4 bil in imports (2013; Table 6). Table 6 indicates that Penang was a net importer of goods from TPP member countries in 2012 (-RM3.06 bil) and 2013 (-RM1.93 bil), and a net exporter to TPP countries for January-November 2014 (RM3.5 bil).

¹⁴ OECD (2015), 'OECD Science, Technology and Industry Scoreboard 2011'.

¹⁵ The trade-to-GDP ratio for Penang should be taken with caution, as Penang trade data is recorded for trade activities through Penang Port and Penang International Airport. Goods passing through these ports could originate from elsewhere in the northern region (e.g. Kedah, Perlis etc.), so that this ratio is likely inflated in the Penang scenario. The same caveat applies for exports and imports data.

¹⁶ See footnote 15.

3 of the TPP members (United States (US), Japan, Singapore) are part of Penang's 10 largest trading partners (ranked by the sum of imports and exports) (Table 7). However, China, Taiwan and South Korea, which have consistently appeared as Penang's top 10 trading partners throughout 2012-2014, are not TPP member countries. 3 TPP member countries, namely the US, Japan and Singapore, are in Penang's top 10 export destinations (Figure 7), constituting RM35.2 bil (2013) or 13.8% of total exports. 4 TPP member countries are present in Penang's top 10 sources of imports (Figure 8) - US, Japan, Singapore and Vietnam, with RM52.8 bil or 37.4% (2013) of imports originating from these countries. 3 TPP members (US, Japan, Singapore) are part of Penang's 10 largest trading partners (ranked by the sum of imports and exports) (Table 7).

Among TPP countries (Figure 9), the US (RM26.9 bil/17.0%; Jan-Nov 2014) dominates Penang exports, followed by Japan (RM11.24 bil/7.1%; Jan-Nov 2014) and Singapore (RM6.28 bil/4.0%; Jan-Nov 2014), each making up less than half of the value of Penang exports to the US throughout 2012-2014. The US is less dominant in the case of Penang imports (**Error! Reference source not found.**; RM20 bil/14.1%; Jan-Nov 2014). However, both Singapore and the US contributing a similar proportion of Penang imports in 2012 (RM18 bil/14.1%, RM19.11 bil/14.4%) and 2013 (RM14.88 bil/10.6%; RM18.7 bil/13.3%). Japan and Vietnam (**Error! Reference source not found.**; RM12.0 bil/8.5%, RM3.4 bil/2.4%; Jan-Nov 2014) are also significant sources of Penang imports.

From the above, the TPP's impact on Penang's trade balance would depend primarily on its influence on Penang's present and future trade relations with TPP countries, particularly US, Japan, Singapore and Vietnam, assuming the importance of these countries as Penang's main trading partners persists into the future. Other TPP countries will likely have large potential for trade growth with Penang¹⁷. At the Malaysia level, PwC expects exports and imports to rise following the TPP, but imports are expected to rise faster than exports (0.65-1.17 percentage points; 0.54 - 0.90 percentage points). Thus Malaysia's trade surplus is expected to decrease in size. While a shrinking trade surplus is not inherently bad, an increase in imports could adversely impact the fortunes of less competitive local firms. Assuming Penang is a net importer to TPP countries, Penang's trade surplus can be expected to decrease following the TPP¹⁸.

However, Penang's overall economic structure and composition of trade differs from the nation. In comparison, the proportion of Malaysia's machinery and transport equipment trade is smaller than Penang's, and notably mineral fuels and lubricants form a larger proportion of Malaysian exports and imports compared to Penang (Figure 10 and Figure 11). The large majority of Penang's imports and exports comprise of machinery and transport equipment (64.9%, 72.6%; January – October 2015), but its proportion of Penang exports have decreased slightly over time, whereas crude materials and chemicals as a fraction of exports grew slightly over time (data not shown).

Turning to Penang imports, the percentage of machinery and transport equipment as a proportion of imports has decreased. Some increase over time was observed for the manufacturing, chemicals, mineral fuels, crude materials (inedible) and food industries (data not shown). The product composition of Penang's imports is relatively heterogeneous as opposed to exports, although as

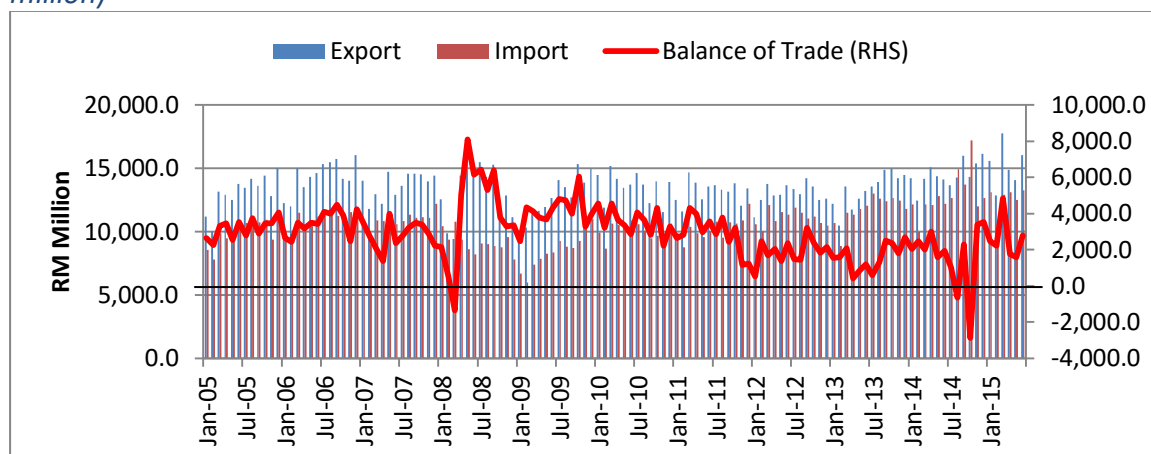
¹⁷ The TPP may also have an effect on trade with non-TPP nations, as Penang producers may substitute products imported from non-TPP nations with cheaper products from TPP nations following the reduction in trade barriers, resulting in a reduction of welfare (trade diversion).

¹⁸ As noted above, this was not the case in January-November 2014.

noted above, both exports and imports are dominated by machinery and transport equipment. Additionally, manufacturing goods make up 7.5% of Penang imports and 4.2% of Penang exports, whereas miscellaneous manufacturing articles make up 6.8% of Penang imports and 16.1% of Penang exports.

PwC¹⁹ sector-level analysis on the Malaysian economy anticipates greater market access arising from the TPP to have a positive impact on exports in the electronics and engineering, automotive and plastics industries (0.73-1.28, 1.02-1.74 and 0.69-1.17 percentage points respectively in 2027).

Figure 6: Monthly exports, imports and balance of trade, Penang, Jan 2005 – Jun 2015 (RM million)



SOURCE: DOSM

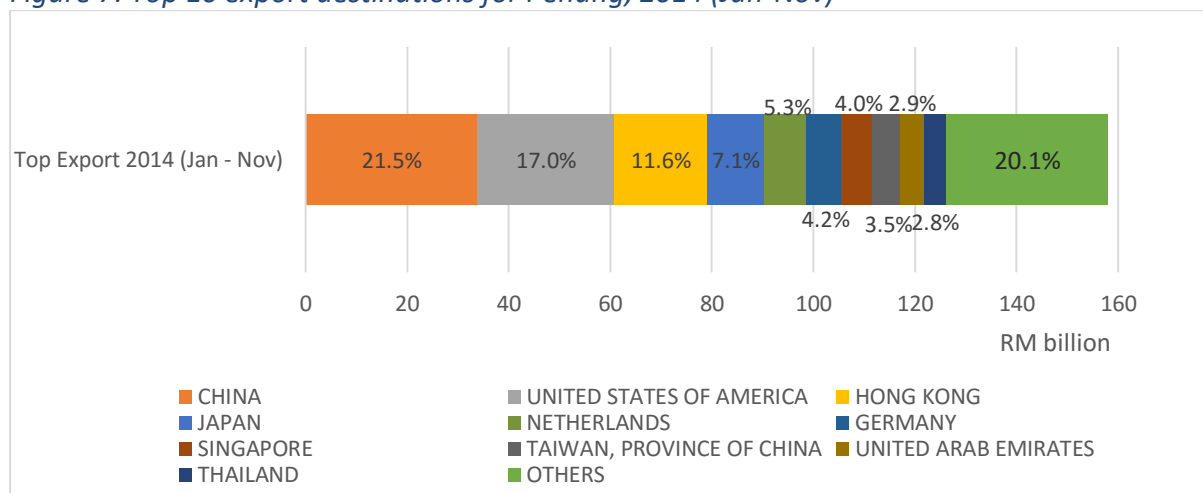
Table 6: TPP member countries' exports and imports through Penang Port, 2012 – 2014 (Jan – Nov) (RM)

Countries	2012		2013		2014 (Jan-Nov)	
	Exports	Imports	Exports	Imports	Exports	Imports
Australia	3,112,761,266	1,621,283,462	3,070,878,016	1,671,927,190	2,995,748,966	1,402,190,653
Brunei	107,740,018	2,553,013	125,246,186	1,885,007	121,070,953	4,722,092
Chile	113,324,481	58,747,331	116,476,062	34,649,739	149,847,566	30,990,578
Canada	1,226,682,419	486,696,007	926,260,258	504,594,937	780,642,987	430,183,868
Mexico	2,445,102,281	167,667,549	2,276,277,837	289,756,351	2,699,875,399	440,869,523
Japan	12,147,068,201	12,829,649,486	11,541,372,641	11,826,035,728	11,241,912,499	11,988,558,673
Singapore	6,281,454,491	18,827,172,345	6,624,445,353	14,881,914,905	6,281,786,382	12,666,920,675
Peru	99,464,604	1,323,768	104,936,693	1,561,096	75,203,224	1,756,899
New Zealand	319,869,184	100,102,397	327,326,488	109,835,947	357,812,812	130,812,845
United States	26,715,396,320	19,114,363,028	25,490,050,959	18,701,407,527	26,884,234,045	20,010,265,819
Vietnam	2,637,184,853	5,058,192,943	2,840,946,016	7,353,456,109	2,401,615,065	3,409,679,850
Total	55,206,050,130	58,267,753,341	53,444,218,522	55,377,026,549	53,989,749,898	50,516,951,475
Balance of trade	-3,061,703,211		-1,932,808,027		3,472,798,423	

Source: DOSM

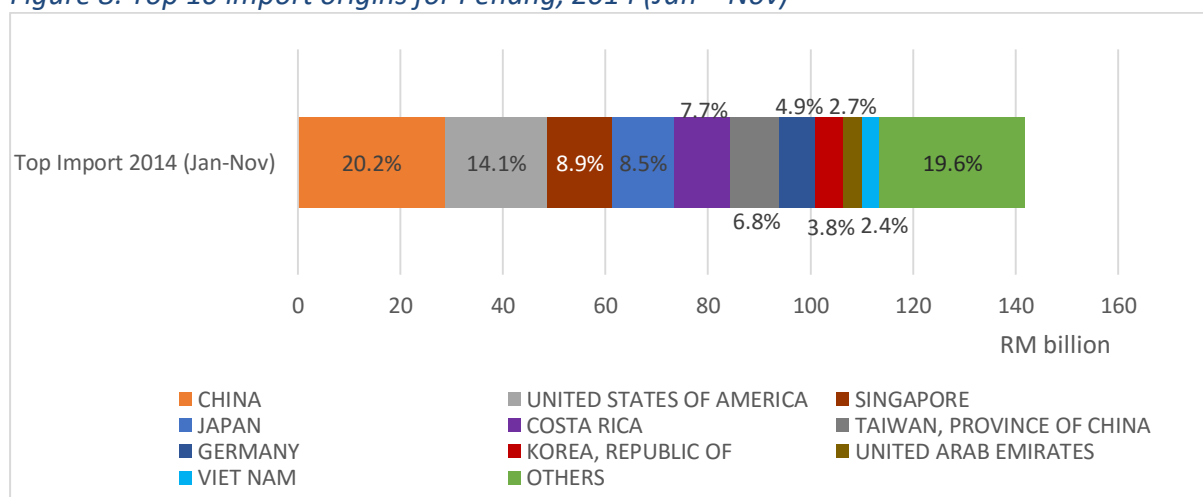
¹⁹ PwC (2015), 'Study on Potential Economic Impact of TPPA on the Malaysian Economy and Selected Key Economic Sectors'.

Figure 7: Top 10 export destinations for Penang, 2014 (Jan-Nov)



SOURCE: DOSM

Figure 8: Top 10 import origins for Penang, 2014 (Jan – Nov)



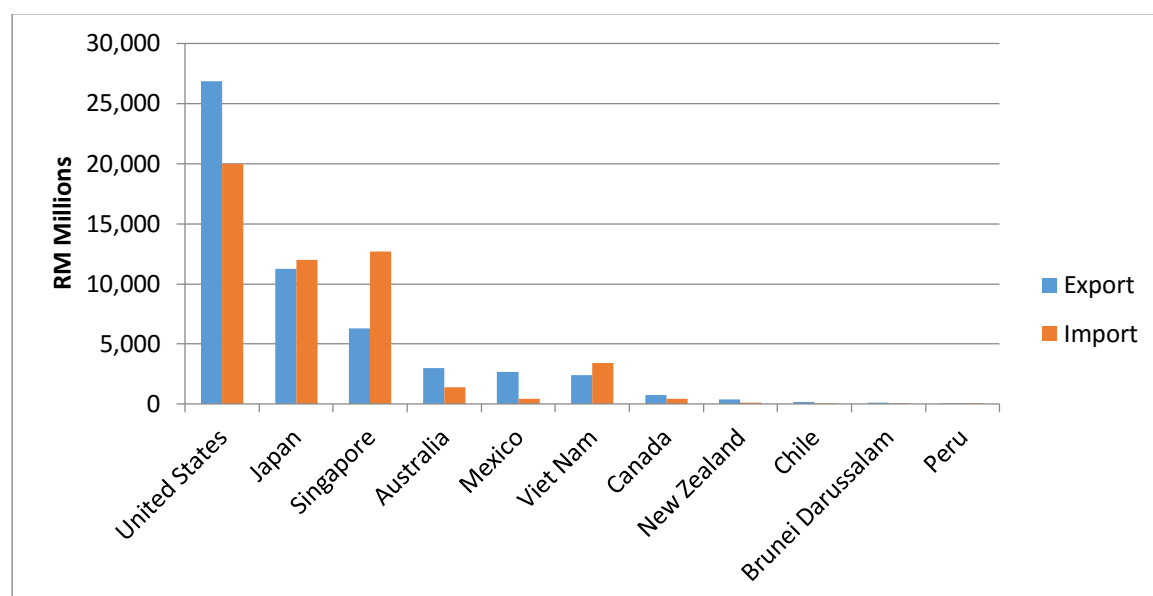
SOURCE: DOSM

Table 7: Top 10 trading partners of Penang ranked by sum of exports and imports, 2012 – 2014 (Jan – Nov) (RM)

2012		2013		2014 (Jan-Nov)	
CHINA	59,428,663,121	CHINA	64,202,858,951	CHINA	62,595,887,031
UNITED STATES	45,829,759,348	UNITED STATES	44,191,458,486	UNITED STATES	46,894,499,864
SINGAPORE	25,108,626,836	JAPAN	23,367,408,369	JAPAN	23,230,471,172
JAPAN	24,976,717,687	SINGAPORE	21,506,360,258	HONG KONG	21,488,258,885
HONG KONG	19,465,321,121	HONG KONG	19,382,755,563	SINGAPORE	18,948,707,057
GERMANY	12,938,442,921	TAIWAN	14,197,727,405	TAIWAN	15,151,010,206
TAIWAN	11,978,140,808	GERMANY	12,838,919,554	GERMANY	13,632,594,990
SOUTH KOREA	9,358,782,774	UAE	10,714,126,394	COSTA RICA	11,013,268,033
UAE	8,780,472,078	VIETNAM	10,194,402,125	NETHERLANDS	9,314,404,251
VIETNAM	7,695,377,796	SOUTH KOREA	9,126,451,409	SOUTH KOREA	9,003,743,118

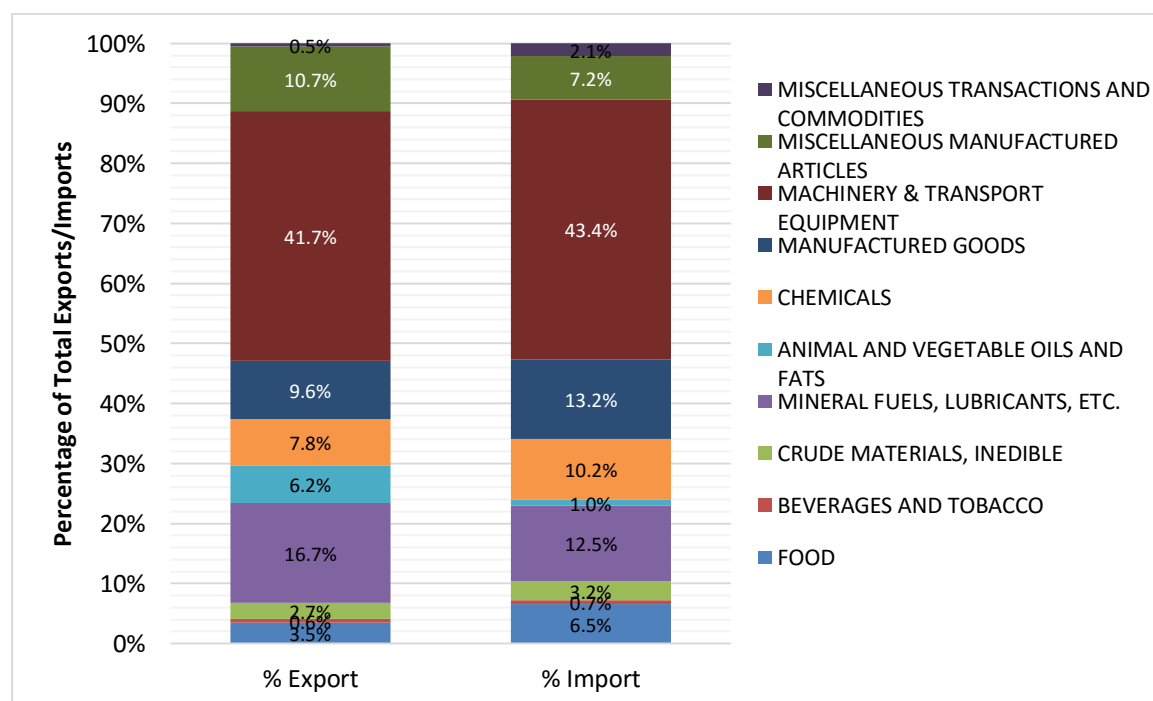
SOURCE: DOSM

Figure 9: Exports and Imports from TPP member countries for Penang, 2014 (Jan – Nov)



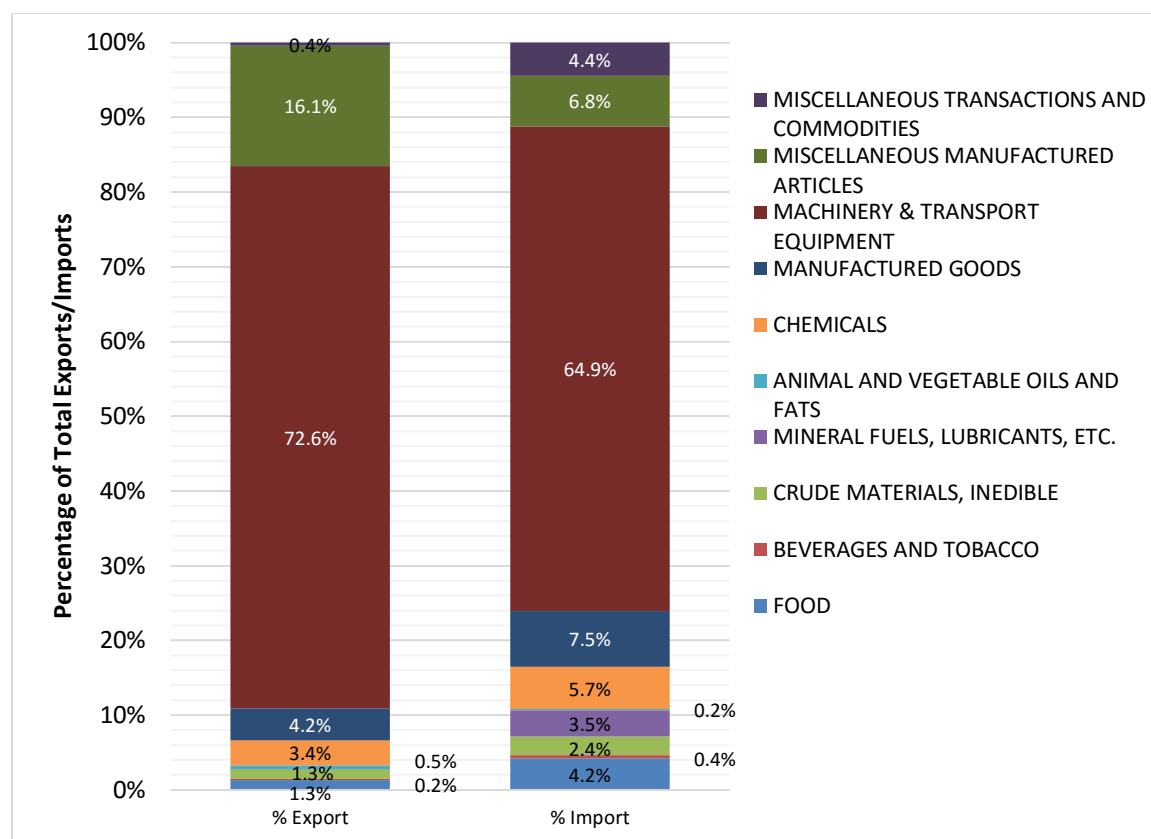
SOURCE: DOSM

Figure 10: Malaysia exports and imports by Standard International Trade Classification (SITC) category, Jan - Nov 2015



SOURCE: DOSM

Figure 11: Penang exports and imports by Standard International Trade Classification (SITC) category, Jan - Oct 2015



SOURCE: DOSM

5. Investment

Akin to their major role in trade with Penang, TPP member countries Singapore, US and Japan make major contributions to foreign investment in Penang in 2014 (Table 8). US investment in Penang pales in comparison to Singapore foreign investment in Penang, whether measured in monetary or employment terms. Singaporean investment in Penang is nearly four times that of the US, associated with 3.5 times more employment than US manufacturing projects, although Singapore has 16 investments in Penang compared to 10 originating from the US.

The top 5 industries receiving foreign investment in Penang (Table 9) are Electronics & Electrical Products (87.4%), Scientific & Measuring Equipment (4.6%), Chemical & Chemical Products (2.0%), Petroleum Products (1.9%) and Machinery & Equipment (1.2%). These 5 industries collectively contribute to 97% of foreign investment, while the E&E sector dominates.

Table 8: Approved manufacturing projects with foreign participation by country in Penang, 2014 (TPP countries in bold)

Country	Number	Employment	Investment (RM)
Singapore	16	4,776	3,096,963,449
Ireland	1	537	842,030,053
United States	10	1,353	287,726,783
Netherlands	5	2,417	185,714,475
Switzerland	2	277	184,000,000
Taiwan	12	1,213	181,884,980
Germany	3	121	152,794,943
Japan	5	348	64,931,078
Others	6	605	56,114,714
Cayman Islands	1	301	20,800,000
China	3	52	10,135,181
Indonesia	2	184	9,969,551
India	1	141	7,608,878
France	1	105	3,774,000
British Virgin Islands	2	20	3,540,600
Austria	1	74	2,430,000
Denmark	1	24	1,430,000
Australia	1	247	687,046
Saudi Arabia	1	24	550,000
United Kingdom	2	41	389,280
Panama	1	26	119,280
Total	77	12,886	5,113,594,291

SOURCE: MIDA

Table 9: Approved manufacturing projects in Penang by industry, 2014

Industry	Foreign Investment (RM)	Share of Foreign Investment (%)
Electronics & Electrical Products	4,470,572,353	87.4
Scientific & Measuring Equipment	235,320,945	4.6
Chemical & Chemical Products	102,796,202	2.0
Petroleum Products (Inc. Petrochemicals)	97,480,000	1.9
Machinery & Equipment	63,890,571	1.2
Food Manufacturing	48,978,823	1.0
Non-Metallic Mineral Products	29,470,943	0.6
Basic Metal Products	23,365,970	0.5
Transport Equipment	18,335,200	0.4
Fabricated Metal Products	13,787,239	0.3
Wood & Wood Products	8,909,000	0.2
Paper, Printing & Publishing	687,046	0.0
Total	5,113,594,291	100

SOURCE: MIDA

6. Intellectual Property

Intellectual property (IP) statistics is normally used as a proxy or yardstick for the level of scientific and technology innovations in a particular country. According to the Intellectual Property Corporation of Malaysia (MyIPO), only 322 patents were granted to local patent owners in January-November 2015 (Figure 12), whereas just 27 were granted to Penang patent owners in 2015. This could be attributed to low domestic innovative activity, low awareness of the benefits of patent registration or low confidence in the ability of domestic IP protection mechanisms leading to innovators refusing to undergo the patent registration process for their inventions. The TPP includes provisions for the greater protection of IP rights, hence IP registrations would be expected to increase when the TPP comes into force.

Over the period of 2000-2015, 239 patents were granted by the Malaysia patent office to Penang owners (Table 10). Companies are the largest owner of patents granted, with 118 patents granted to companies over this period (Table 11). Over a quarter of patents (66, Table 10²⁰) granted by the Penang office over this period are attributable to the local public university, Universiti Sains Malaysia (USM). 50 patents were registered by owners from the Bayan Lepas area, with 16 originating from the Free Industrial Zone and 34 originating from outside the FIZ²¹.

Table 12 suggests that Japan and United States (US)-based patent owners will be the biggest beneficiaries of greater IP protection arising from the TPP provisions among patent owners registered at the Malaysia IP office, as patent owners from Japan and the United States have the highest number of patents in force at the Malaysia IP office among the TPP countries, with 5,823 and 5,196 patents in force respectively in 2014. This is followed by Australia and Singapore, with 303 and 265 patents in force at the Malaysia IP office in 2014.

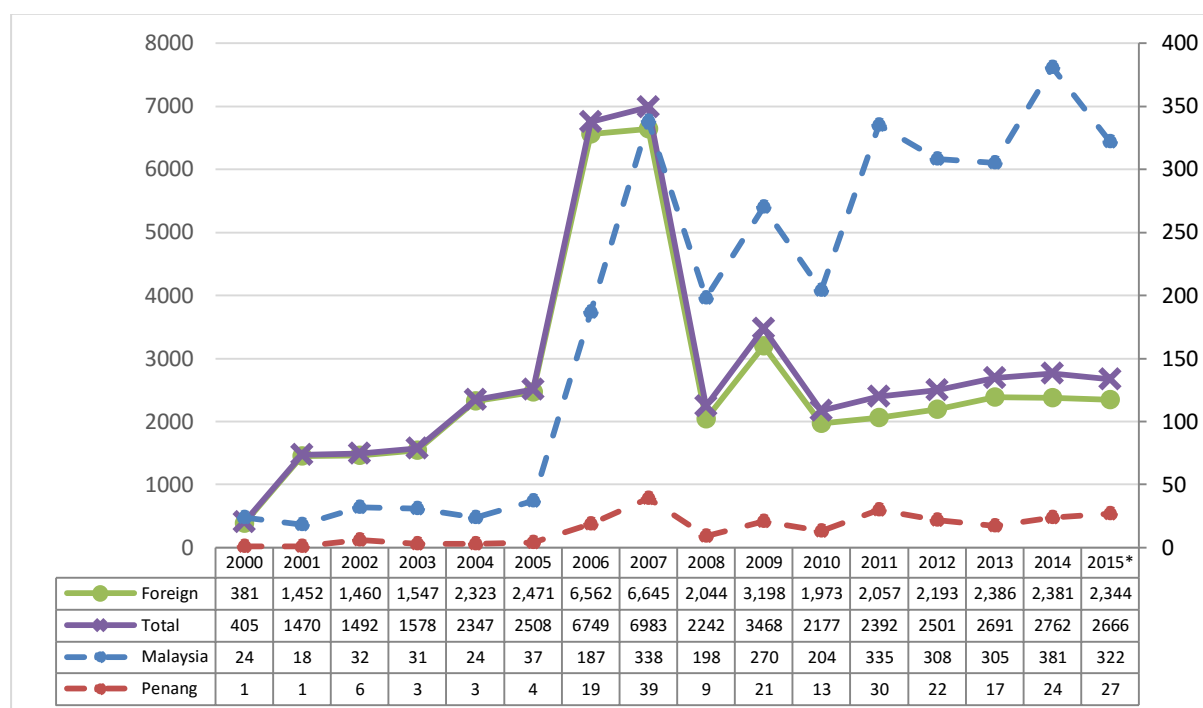
Among TPP countries, the United States patent office records the highest number of patents in force at 2.5mil in 2014 (Table 13), evenly split between 1.2mil non-resident and 1.3mil resident patent owners. Thus, registrants at the US patent office would make up most of the direct beneficiaries of the enhanced IP rights protections under the TPP. This is followed by the Japan patent office, with a total of 1.9mil patents in force and, notably, a larger proportion of resident patent owners to non-resident owners (1,616,472 and 304,018 respectively in 2014). Malaysia is ranked 8th in the total number of patents in force among TPP countries in 2013 with 22,782 patents in force, made up of 20,911 non-resident patents and 1,871 resident patents in force in 2013; and 19,698 non-resident patents and 1,870 resident patents in force in 2014.

Table 14 indicates that most TPP countries have the most patents granted in Category III (Chemistry) in the period 1990-2014 except Japan and the US, which record the highest number of Category I (Electrical engineering) patents granted at 1.01mil and 1.55mil respectively compared to Category III patents (546,934 and 726,308 respectively); and Chile, with 28 Category IV (Mechanical engineering) patents granted.

²⁰ The calculations summarised in Table 10 and Table 11 only consider the first owner listed, and USM is, in some cases, listed as the second owner of the patent.

²¹ Bayan Lepas Industrial Park (12), Kawasan Perindustrian Bayan Lepas (4), Bayan Lepas Industrial Zone (2), Bayan Lepas Non-Free Industrial Zone (1), Bayan Lepas Industrial Estate (5), other Bayan Lepas (10)

Figure 12: Patents granted by MyIPO according to address of patent owner, 2000-2015



SOURCE: INTELLECTUAL PROPERTY CORPORATION OF MALAYSIA (MyIPO)

* Malaysia and foreign data for 2015 up to Nov 2015

Table 10: Breakdown of owners of patents from Penang by address, 2000-2015²²

Address and top patent owners	Patents
Bayan Lepas <ul style="list-style-type: none"> LIM SOON HUAT (4) TEST TOOLING SOLUTIONS (M) SDN BHD (3) WIDETECH MANUFACTURING SDN. BHD. (4) INVENTEC ELECTRONICS (M) SDN BHD (3) 	50
Universiti Sains Malaysia²³ <ul style="list-style-type: none"> INETMON SDN BHD (2) USM (64) 	66
Other island <ul style="list-style-type: none"> TREK SYSTEMS (M) SDN BHD (7) NG HONG LIANG (5) JABATAN PENGAIRAN DAN SALIRAN PULAU PINANG (2) LOH ENG GIAP (2) 	50

²² The breakdown was calculated using the first owner listed in the patents registry. This breakdown considers all patents registered with the Malaysia patent office with at least one owner with a Penang address, which is why other Malaysia and foreign addresses are available.

²³ Inclusive of Nibong Tebal campus. iNetmon Sdn Bhd works with the University's R&D arm.

Mainland <ul style="list-style-type: none"> • DERICHEM (M) SDN BHD (4) • EONMETALL SYSTEMS SDN BHD (4) • EONMETALL TECHNOLOGY SDN BHD (3) • SIN RUBTECH CONSULTANCY SDN BHD. (3) 	62
Other Malaysia <ul style="list-style-type: none"> • PURECIRCLE SDN. BHD. (2) • ASOONICA SYSTEM SDN. BHD. (1) • MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION, MALAYSIA. (1) • INSTITUT PENYELIDIKAN DAN KEMAJUAN PERTANIAN MALAYSIA (MARDI) (1) 	8
Foreign <ul style="list-style-type: none"> • ADVANTEST CORPORATION (1) • MARUYAMA MANUFACTURING CO., INC. (1) • SONY CORPORATION (1) 	3
Total	239

SOURCE: MYIPO, AUTHOR'S CALCULATIONS

Table 11: Breakdown of owners of patents from Penang by category of owner, 2000-2015²⁴

Category of owner and top patent owners	Patents
Companies <ul style="list-style-type: none"> • TREK SYSTEMS (M) SDN BHD (7) • DERICHEM (M) SDN BHD (4) • EONMETALL SYSTEMS SDN BHD (4) • TEST TOOLING SOLUTIONS (M) SDN BHD (4) 	118
Individuals <ul style="list-style-type: none"> • NG HONG LIANG (5) • LIM SOON HUAT (4) • KHOR WEI LIP (2) • LIN HSIN YUNG (2) 	48
Government <ul style="list-style-type: none"> • JABATAN BOMBA DAN PENYELAMAT MALAYSIA (2) • JABATAN PENGAIRAN DAN SALIRAN PULAU PINANG (2) • MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION (1) • INSTITUT PENYELIDIKAN DAN KEMAJUAN PERTANIAN MALAYSIA (MARDI) (1) 	9
Universiti Sains Malaysia (USM)	64
Total	239

SOURCE: MYIPO, AUTHOR'S CALCULATIONS

²⁴ See Footnote 22

*Table 12: Patents in force registered with the Malaysia patent office for applicants originating from TPP countries, 2013 and 2014*²⁵

Country of origin of applicant	2013	2014
Australia	320	303
Brunei Darussalam	1	1
Canada	97	96
Chile	3	3
Japan	6,343	5,823
Mexico	55	52
New Zealand	38	37
Singapore	278	265
United States of America	5,196	4,973

SOURCE: WIPO STATISTICS DATABASE, LAST UPDATED DECEMBER 2015

Table 13: Patents in force in TPP countries, 2013 and 2014

	2013			2014		
	Non-resident	Resident	Total	Non-resident	Resident	Total
Australia	113,122	9,689	122,811	118,735	9,672	128,407
Brunei	97	22	119	-	-	
Canada	135,466	18,315	153,781	141,627	19,815	161,442
Chile	8,676	909	9,585	8,969	1,018	9,987
Japan	267,280	1,570,897	1,838,177	304,018	1,616,472	1,920,490
Malaysia	20,911	1,871	22,782	19,698	1,870	21,568
Mexico	99,233	2,412	101,645	103,701	2,639	106,340
New Zealand	27,846	371	28,217	28,487	367	28,854
Peru	2,542	73	2,615	2,580	71	2,651
Singapore	42,708	3,291	45,999	-	-	
United States of America	1,164,800	1,222,702	2,387,502	1,242,268	1,285,482	2,527,750
Vietnam	10,203	412	10,615	14,044	549	14,593
Grand Total	1,892,884	2,830,964	4,723,848	1,984,127	2,937,955	4,922,082

SOURCE: WIPO STATISTICS DATABASE, LAST UPDATED DECEMBER 2015

²⁵ Statistics not available for Vietnam and Peru

Table 14: Patents granted between 1990 and 2014 at TPP countries' patent offices categorised according to WIPO IPC-Technology Concordance Table²⁶

IP Office	Applicant	I	II	III	IV	V	Unknown
Australia	Non-Resident	39,246	45,291	122,985	47,399	20,312	176
	Resident	2,765	3,088	4,917	6,663	5,264	407
	Total	42,011	48,379	127,902	54,062	25,576	583
Canada	Non-Resident	58,178	50,897	117,736	82,926	30,760	266
	Resident	7,706	4,422	7,022	10,629	7,365	24
	Total	65,884	55,319	124,758	93,555	38,125	290
Chile	Non-Resident	1	4	13	17	4	
	Resident	-	2	4	11	5	
	Total	1	6	17	28	9	
Japan	Non-Resident	140,711	77,394	117,625	86,827	16,301	32
	Resident	871,495	432,379	429,309	709,450	272,245	702
	Total	1,012,206	509,773	546,934	796,277	288,546	734
Malaysia	Non-Resident	7,654	2,272	11,702	4,931	1,717	1,027
	Resident	304	188	531	396	307	411
	Total	7,958	2,460	12,233	5,327	2,024	1,438
Mexico	Non-Resident	1,220	1,123	6,541	3,947	894	90
	Resident	46	82	367	251	185	37
	Total	1,266	1,205	6,908	4,198	1,079	127
New Zealand	Non-Resident	6,884	8,639	49,820	14,051	6,018	1,951
	Resident	861	659	1,279	2,647	1,729	1,536
	Total	7,745	9,298	51,099	16,698	7,747	3,487
Singapore	Non-Resident	1,659	662	1,738	1,123	614	95
	Resident	11	7	2	15	6	1
	Total	1,670	669	1,740	1,138	620	96
United States of America	Non-Resident	784,152	312,994	332,635	398,689	95,570	407
	Resident	770,445	369,685	393,673	393,351	185,964	1,564
	Total	1,554,597	682,679	726,308	792,040	281,534	1,971
Vietnam	Non-Resident	17	1	15	15	6	14
	Resident	1	1	6	4	1	-
	Total	18	2	21	19	7	14

SOURCE: WIPO STATISTICS DATABASE, LAST UPDATED DECEMBER 2015

²⁶ Categories: I refers to electrical engineering; II refers to instruments; III refers to chemistry; IV refers to mechanical engineering; V refers to other fields. The above is sorted according to the WIPO IPC-Technology Concordance Table, available at

http://www.wipo.int/export/sites/www/ipstats/en/statistics/patents/pdf/wipo_ipc_technology.pdf

Categories with the highest number of patents in bold

Limitations: While the WIPO database does not provide comments on the completeness of the data, there appears to be a discrepancy between the WIPO database and data obtained from MyIPO, the Malaysia IP office. WIPO appears to understate patent data, with just 31,429 patents granted in 2003-2013 vs 35,636 over the same period on MyIPO. We were not able to complete the holes in Malaysia patent data in the WIPO database using MyIPO data. Columns are empty in the WIPO database for Chile (all except 2005), Japan (1990-1992, 1994-1995), Malaysia (1990-1995, 1997-2002, 2014), Singapore (1996-2014) and Vietnam (1998-2009).

7. Labour Force

In the period 2005–2014, Penang consistently had a lower unemployment rate than Malaysia (Figure 13), maintaining a gap of 1–1.6 percentage points between Malaysia and Penang’s unemployment rate throughout said period. Assuming an unemployment rate below 4% corresponds to full employment, Figure 13 suggests that both Malaysia and Penang have been in a state of full employment throughout 2005 to 2014.

The current size of Penang’s labour force is 821,800²⁷, although the absolute size of Penang’s labour force and the proportion of the working-age population in the labour force (68.7%, Q3 2015) has declined in recent years (Figure 14). The increasingly foreign composition of Malaysia’s labour force has led to growing public angst. Participants in the labour force of foreign origin have grown from 2–4% in the 1980s to 13.0% (2014) (Figure 15). World Bank research²⁸ estimates that Penang has 5% (2010) of Malaysia’s foreign workers.

A spike of over 4 percentage points of the share of foreign labour in Malaysia’s labour force was observed in 1996. This suggests that the influx of foreign labour is not a recent phenomenon, dating back to over a decade. The policy shift towards foreign labour began far earlier in the early 1970s in line with Malaysia’s growth strategy, with formal guidelines introduced in the early 1990s. Foreign labour was introduced as an interim rather than a permanent measure, as government policy was orientated towards fulfilling demand for unskilled labour while amassing domestic skilled labour. The high foreign composition of the labour force today suggests that foreign labour is here to stay, to the extent that employers have been criticised for preferring foreign over local labour in certain sectors; in fact, the proportion of foreign workers in each sector differs, with the highest proportion of foreign workers in elementary occupations (Figure 16)²⁹.

Theoretically, the effects of a foreign worker influx on the employment of locals can be positive or negative, depending on the nature of the labour market. Foreigners could substitute for local workers, resulting in deteriorating employment outcomes for local workers, i.e. reduced wage and employment. The alternative scenario is where foreigners ‘complement’ locals, freeing up local workers to make better use of their human capital, hence increasing domestic wages and employment, e.g. secondary school-educated locals supervise low-skilled foreign workers. In general, the World Bank research suggests that skilled and semi-skilled workers benefit from migration, whereas unskilled workers are negatively affected. The aforementioned research also suggests that immigration reduces crime due to the increase in economic activity. However, the pool of unskilled foreign labour available to employers does not provide employers with incentives to make productivity-enhancing investments to move up the value chain, depressing demand for skilled labour³⁰.

Penang’s manufacturing sector is moving up the value chain into value-added activities, a departure from its traditional specialization in its comparative advantage of cheap labour, hence creating a

²⁷ Labour Force Survey 2014, DOSM; 814,000 as of Q3 2015

²⁸ World Bank (2010), ‘Immigration in Malaysia: Assessment of its Economic Effects, and a Review of the Policy and System’.

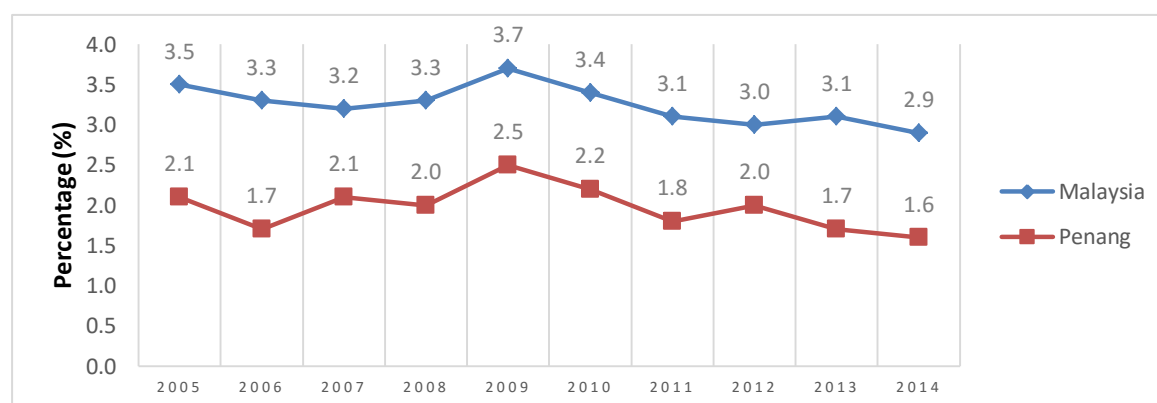
²⁹ These numbers are likely to be understated as the data about undocumented workers is probably unreliable.

³⁰ OECD (2013), ‘Southeast Asian Economic Outlook 2013: With Perspectives on China and India’.

need for skilled labour. An indication of the supply of skilled labour can be obtained from the percentage of tertiary-educated persons in the labour force (Table 15). Penang's is above the national average at 29.3%, ranked just below Putrajaya, Kuala Lumpur and Selangor. On the other hand, the percentage of tertiary-educated persons employed closely follows the national trend, although the proportion of Penang tertiary-educated workers rose faster than Malaysia in 2014. 29% of employed Penangites had a tertiary education, compared to 26.4% of Malaysians (Figure 17), indicating that Penang workers attain, on average, a higher level of education than the average Malaysian worker. This is consistent with Penang's median household income being higher than Malaysia's throughout the period 2009-2014 (Figure 18), in line with the theoretical prediction that additional years of education unambiguously adds to wages.

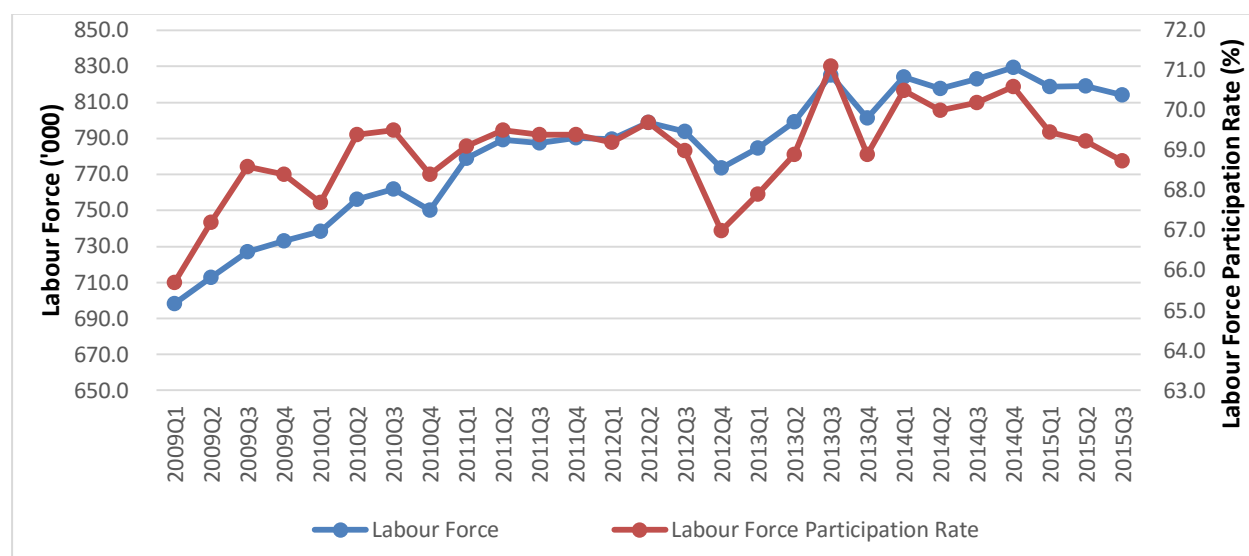
The sectorial breakdown of Penang's employment does not reflect the relative homogeneity of Penang's economy compared to the overall Malaysian economy; in fact, employment patterns in Penang are rather similar to Malaysia (Figure 19). Some differences in the proportion of industry employment should be noted – manufacturing has double the proportion of employment compared to the Malaysian average, at 31.4% compared to Malaysia's 16.7%, and Penang has a slightly larger proportion of employment in accommodation and F&B service activities, probably attributed to greater tourism activity in Penang. On the other hand, Penang has a far lower proportion of agricultural employment compared to the whole of Malaysia, as well as a lower proportion of employment in the construction industry despite rapid growth of the sector.

Figure 13: Unemployment rate in Penang and Malaysia, 2005-2014 (%)



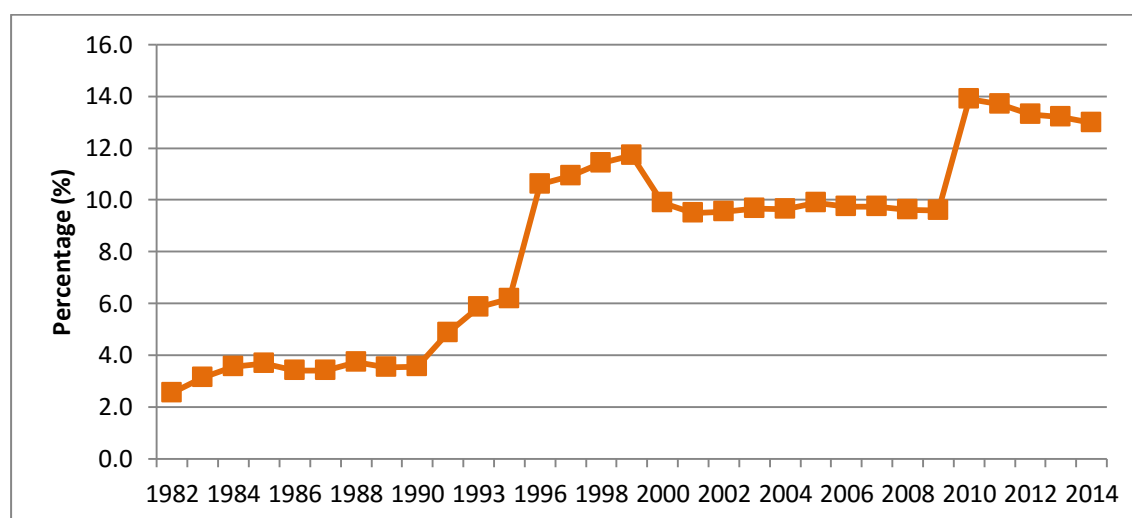
SOURCE: DOSM AND OWN CALCULATIONS

Figure 14: Labour force and labour force participation rate in Penang, Q1 2009 - Q3 2015



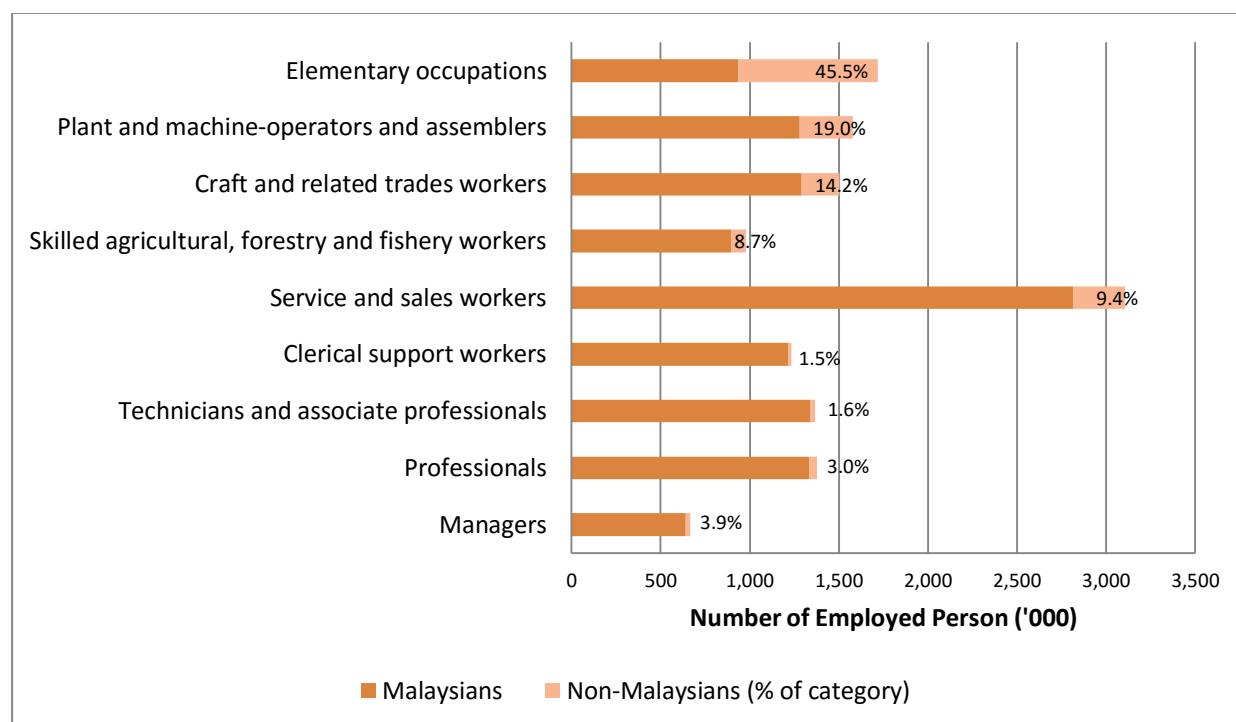
SOURCE: DOSM

Figure 15: Percentage share of Non-Malaysians in labour force, Malaysia, 1982-2014



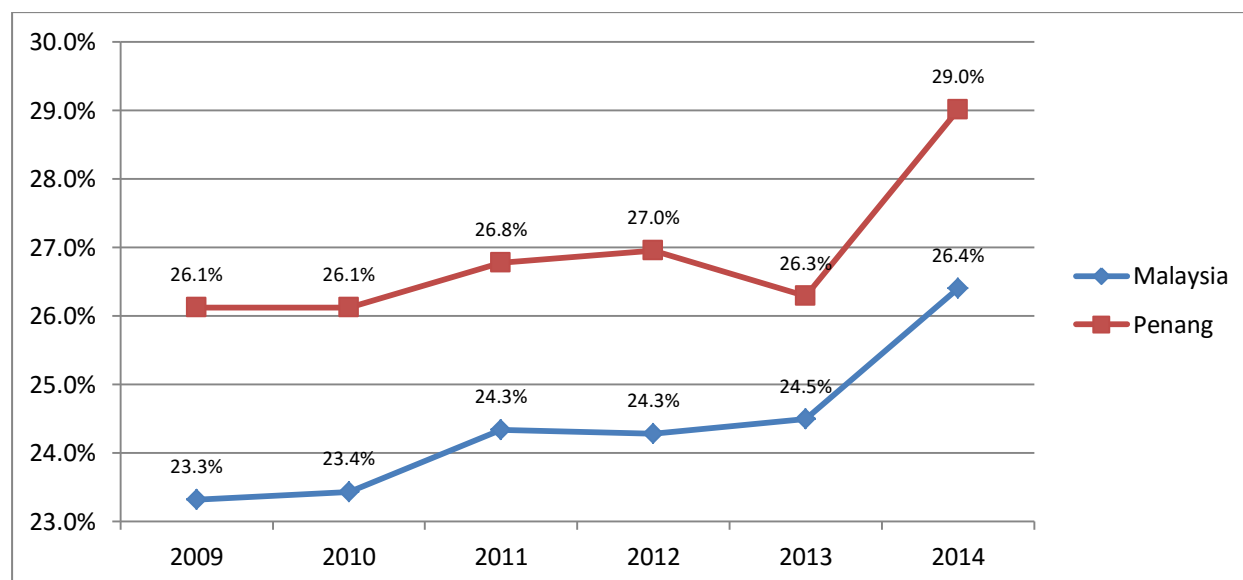
SOURCE: LABOUR FORCE SURVEY, DOSM

Figure 16: Percentage of employed persons in Malaysia of Malaysian nationality by sector, 2014



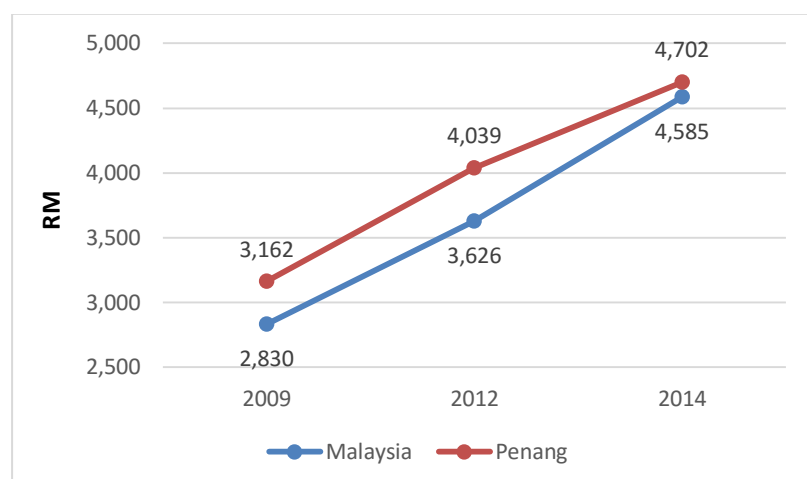
SOURCE: LABOUR FORCE SURVEY 2014

Figure 17: Employed tertiary-educated persons as a percentage of the number of employed persons in Malaysia and Penang, 2009 – 2014



SOURCE: LABOUR FORCE SURVEY 2014, DOSM

Figure 18: Median monthly gross household income in Penang and Malaysia, 2009-2014



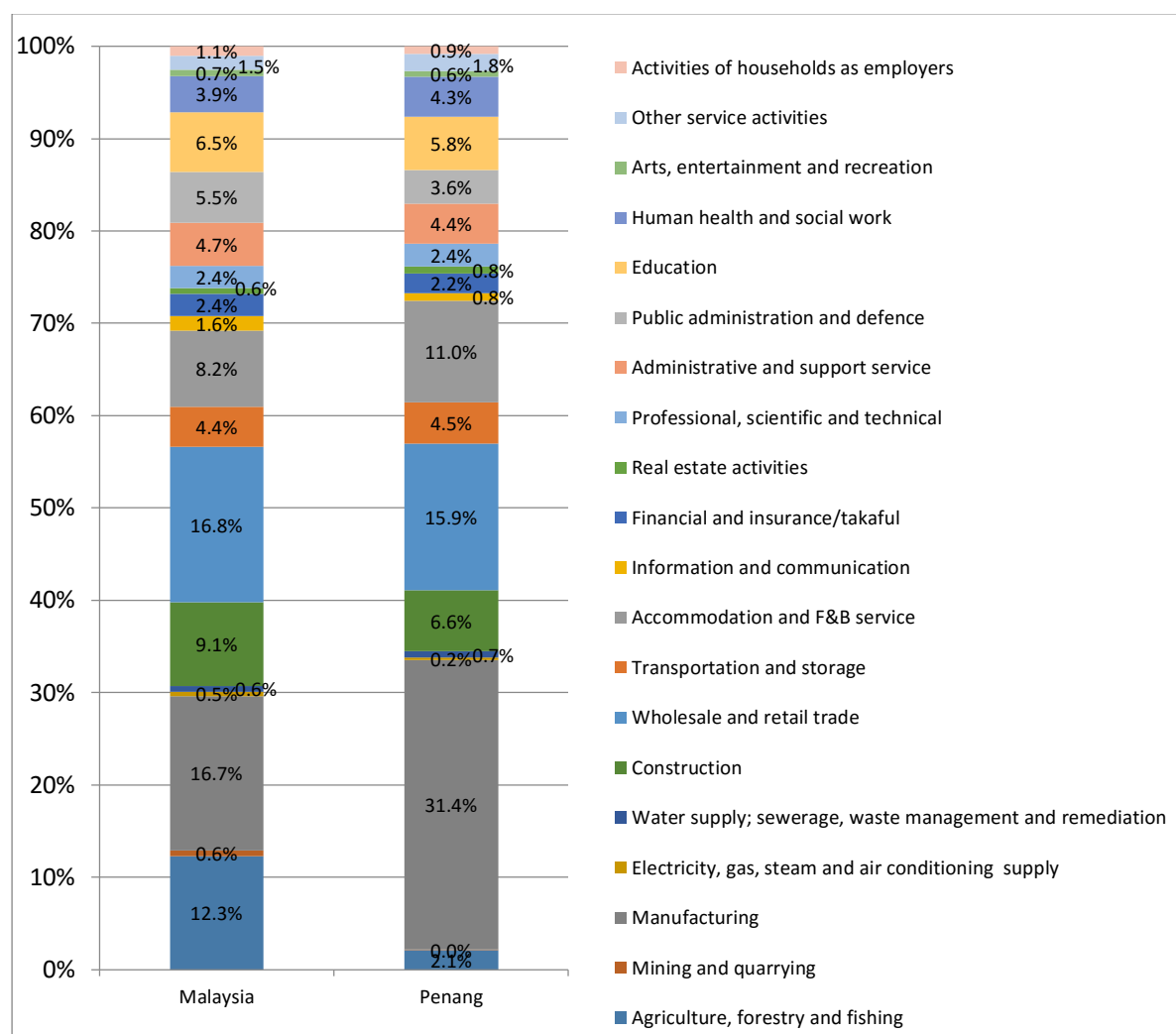
SOURCE: HOUSEHOLD INCOME AND BASIC AMENITIES SURVEY REPORT 2009, 2012, 2014, DOSM

Table 15: Percentage of tertiary-educated persons in the labour force, 2014

W.P. Putrajaya	63.5%
W.P. Kuala Lumpur	40.1%
Selangor	36.9%
Penang	29.3%
Melaka	27.2%
Terengganu	27.2%
Negeri Sembilan	26.4%
Perlis	26.3%
Kelantan	24.9%
W.P. Labuan	24.1%
Kedah	23.7%
Pahang	22.1%
Johor	21.3%
Perak	21.1%
Sarawak	19.4%
Sabah	17.1%
Total	26.7%

SOURCE: LABOUR FORCE SURVEY 2014, DOSM

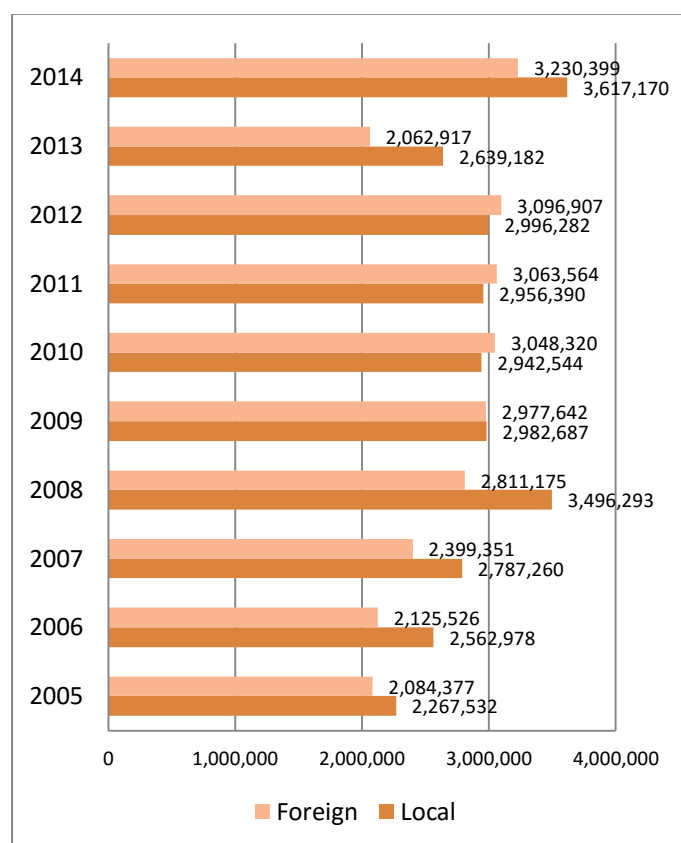
Figure 19: Employed persons in Malaysia and Penang, 2014



8. Tourism

Data on hotel stays suggest that foreign visitors to Penang have increased in all years except for 2013 (Figure 20). Arrivals at Penang International Airport are used as an alternative indicator of tourist volume, although the airport serves both as a gateway to the industrial areas (which suggests the use of the airport for business travel for MNCs based in Penang), private hospitals and the heritage zone, situated just 16km away from the airport. Asia countries feature prominently in the top countries for international visitor arrivals, and out of the top 10 countries for international arrivals, 4 TPP countries – Singapore, Japan, USA and Australia - are present (Table 16).

Figure 20: Hotel stays in Penang, 2005-2014



SOURCE: TOURISM MALAYSIA

Table 16: Total international visitor arrivals, Penang International Airport, YTD Sep 2014 & 2015³¹

	YTD Sep 2014	YTD Sep 2015
Indonesia	219,441	198,906
Singapore	100,983	101,059
China	52,949	49,004
Japan	24,301	23,709
Taiwan	16,734	17,879
USA	16,611	17,198
Australia	14,826	16,607
UK	14,617	14,474
Thailand	14,640	13,581
Western Europe	6,535	5,880
TOTAL	481,637	458,297

SOURCE: IMMIGRATION DEPARTMENT (VIA PENANG GLOBAL TOURISM)

³¹ TPP countries in bold

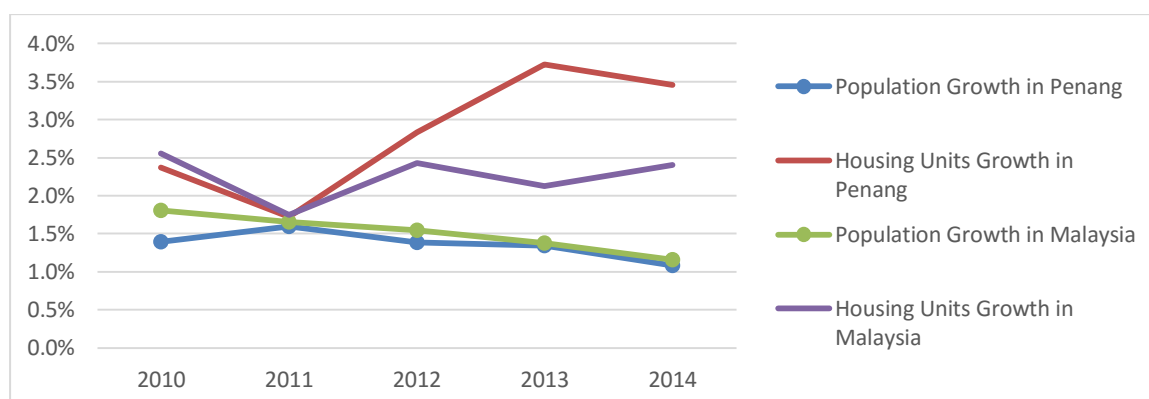
9. Population Growth and Housing Market

The growth in the volume of housing units has outpaced the growth in the Penang and Malaysian population over the period 2010-2014 (Figure 21, Table 17). This trend correlates with declining household size – the size of the average Malaysian household has decreased from 4.6 in 2000 to 4.2 in 2010 (a decline of 8.7%), and the average Penang household has shrunk from 4.3 in 2000 to 3.8 in 2010 (a decline of 11.6%)³². The rate of change of the supply of housing units in Penang grew in spite of population growth slowing in both Penang and Malaysia. Malaysia and Penang recorded population growth rates of 10.86% and 9.58% respectively over the period 2000-2004, whereas in the period 2010-2014 Malaysia and Penang recorded population growth rates of 5.85% and 5.51% respectively (Table 17). Moreover, DOSM population projections estimates the size of the Penang population in 2030 at 1.86 million, assuming net migration of 2,600/year, an increase of just 10% in the course of 15 years.

Despite Penang's population growing just slower than the national rate, the rate of growth of housing units exceeds the national average by around 1.1 percentage points (2014), indicating that the construction sector has significant growth potential. Assuming supply of houses is a valid indication of housing demand, this could mean that Penang faces an aging working population, as older workers amass more wealth over their lifetime and hence are more inclined to purchase houses. This assertion is corroborated by **Error! Reference source not found.**, which indicates that younger age groups are shrinking as a proportion of the Penang labour force whereas the proportion of older persons as a share of the working-age population is growing.

After the TPPA is in force, foreign investors might be encouraged to purchase more properties. By current restriction rule imposed on foreigners, only properties minimally worth RM1 million in Seberang Perai and RM2 million and above in the Penang Island, can be purchased. This might alter the balance of the housing units supply continues to favour the construction of certain higher value property, if the market demand for these types of property is rising.

Figure 21: Population and housing units growth in Penang and Malaysia, 2010-2014



SOURCE: *THE MALAYSIAN HOUSE PRICE INDEX Q4 2010-2014, NATIONAL PROPERTY INFORMATION CENTRE (NAPIC) AND DOSM*

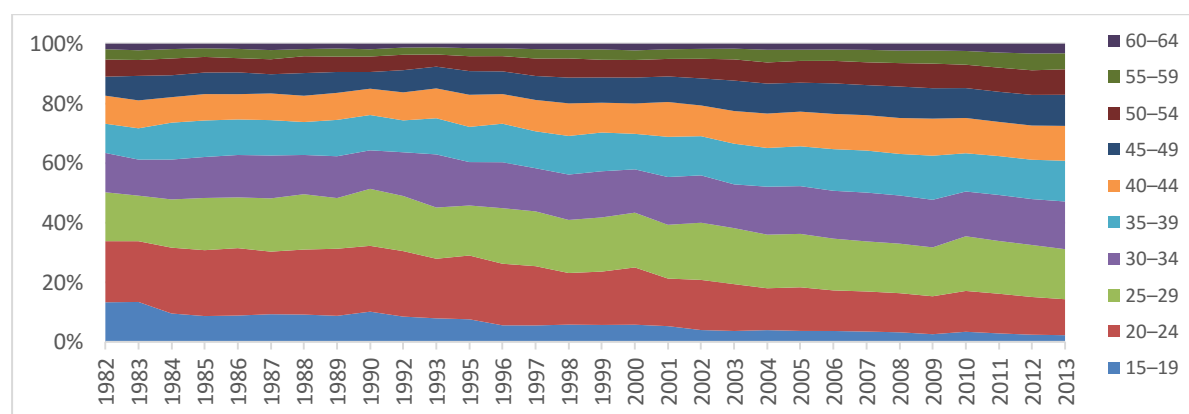
³² 2010 Population and Housing Census of Malaysia, DOSM

Table 17: Population and housing units growth in Penang and Malaysia, 2010-2014

	2010	2011	2012	2013	2014	2010-2014
Population Growth						
Penang	1.39%	1.59%	1.39%	1.34%	1.08%	5.51%
Malaysia	1.81%	1.66%	1.54%	1.37%	1.16%	5.85%
Housing Units Growth						
Penang	2.37%	1.72%	2.84%	3.72%	3.46%	12.25%
Malaysia	2.55%	1.74%	2.43%	2.13%	2.40%	8.99%

SOURCE: THE MALAYSIAN HOUSE PRICE INDEX Q4 2010-2014, NATIONAL PROPERTY INFORMATION CENTRE (NAPIC)

Figure 22: Percentage of Penang labour force by age group, 1982-2013



SOURCE: DOSM

