

Gender Imbalance in Educational Attainment and Labour Market Dynamics: Evidence from Malaysia*

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Abstract: The structure of the labour force in Malaysia has seen a major shift since the 1970s. Expanding economic opportunities have also increased demand for highly educated and skilled workers. The changing face of the Malaysian labour force has been brought about primarily by increased access to educational opportunities. Greater access to education has produced not only a surge in student enrolment but also dramatic improvements in higher education. Women have been major beneficiaries of these changes. This paper shows that gains in tertiary attainment have led to greater depth of human capital through bringing more people, especially females, into the workforce and prolonging their stay there. The positive effects are tempered by several concerns. The female advantage in terms of tertiary enrolment does not translate directly into their participation in the labour market. Female graduates are also more likely than male graduates to be in lower paying jobs or unemployed. Young persons without tertiary education face the prospect of unemployment and being crowded out of the job market by degree holders, many being female. Lagging educational attainment among males who dominate the workforce may also hinder a successful transition to a knowledge economy.

Key words: Gender imbalance, human capital, labour force, occupational structure, tertiary education

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1. Introduction

Gender inequality in education and employment poses a major challenge to development. At the macroeconomic level, gender gaps in education and employment have been shown to significantly impact economic growth (Klasen and Lammana 2009). At the individual level, such gaps perpetuate income inequality and, worse, poverty (Borass and Rodgers III 2003: 14; Leach 2000: 334). Gender inequality lowers individual well-being and is inimical to social justice. For this reason, gender equality in education has been a key goal of the Program of Action adopted at the 1994 International Conference on Population and Development (1994) and reaffirmed by the United Nations' Millennium Development Goals (Unterhalter 2005).

Beyond these inequalities in education and employment, however, the often-ignored linkages between gender inequality in education and the extent and nature of women's labour force participation also impacts development (Mak 1998). Given the critical role played by human capital at each stage of development, any mismatch between the output of the education system and labour force participation naturally leads to inefficiencies in resource use. This has major consequences especially for developing countries, given their scarcity of human capital. As the recent example of South Korea shows, even for middle-income countries, it is the depth of human capital (that is, its quality) upon which they must rely to graduate to an advanced country (Cimoli *et al.* 2009).

Malaysia recognises the important role of women in development and is committed to their increased participation in education and in the economy.¹ As one of the World Bank's 'miracle' economies, the nation's economy has experienced rapid economic growth and structural change (Hill *et al.* 2012; World Bank 1993). The economy has transformed from one of dependency on agriculture to one in which manufacturing, and increasingly services, play a dominant role. In line with the structural transformation of the economy, there have been changes in the patterns of employment away from agriculture to the secondary and tertiary sectors.²

Undoubtedly this changing face of the Malaysian labour force has been made possible by the massive investment in educational opportunities over the years. Today, all Malaysians have access to tuition-free education up to the end of secondary school.³ Tertiary education is now available not only from public institutions of higher learning but also a large number of private colleges and universities.⁴ In addition, public sector

¹ The government's policy to advance women's role in development was embodied in the National Policy for Women, launched in 1989, and a chapter on women was included in the Sixth Malaysia Plan (Malaysia 1991: Chapter 16). Subsequent development plans continue this focus.

² Professional, technical, administrative and managerial workers increased from 9.3% of the workforce in 1982 to 26.3 % in 2011, while the agricultural workforce declined from 31.5% to 8.2% over the same period (Malaysia, Department of Statistics, n.d.).

³ The Malaysian education system consists of six years of primary school education (Standard 1 to 6), and five years of secondary education (Form 1 to 5). The national examination, *Sijil Pelajaran Malaysia* (or Malaysian Education Certificate) is taken at the end of Form 5). Post-secondary education includes certificate, diploma and degree programs, and these have differing entry requirements.

⁴ The sharp rise in tertiary enrolment is due to a significant expansion in the supply of higher education especially since the early 1990s. In 2005, 630 public and private institutions offered tertiary education programs (Malaysia 2006, Table 11-5) compared to just three public universities and a few private institutions in 1970. By 2000, about 35.4% of places in all post-*Sijil Pelajaran Malaysia* programs (certificate, diploma and degree) were in private institutions (Malaysia 2001b).

educational loans have made it possible for those from poorer families to pursue higher education.⁵ Greater access to education has produced not only a surge in student enrolment but also dramatic improvements in higher education. Between 1970 and 2012, the enrolment ratio in upper secondary education increased from 20.1 per cent to 78.0 per cent while tertiary enrolment increased from 0.6 per cent to 42.0 per cent.⁶

The strategy to provide equal educational opportunities to all has brought substantial gains to women. Since the beginning of the 1990s, enrolment ratios of females have been equal to, or exceeded, those of males at all levels of education, the disparity favouring women rising with the level of education (Ministry of Women and Family Development, Malaysia 2003; Tey 2006). This is the result of a higher retention rate among females as well as sharper increases in the enrolment of females in tertiary education (Lee and Nagaraj 2006).⁷

Does the gender imbalance in tertiary education have any implications for the labour force? The objective of this paper is to examine the role of gender in the interaction between human capital formation and labour market dynamics in Malaysia. Labour market dynamics is understood from the perspectives of Malaysia's attempt to avoid the middle-income trap (Kamogawa 2003; World Bank 2007; Yusuf and Nabeshima 2009) by becoming a knowledge economy by 2020 (Malaysia 2001a). Reich (1991; 2005) described a three-tiered work force in knowledge economies consisting of workers providing personal service at the bottom, production workers in the middle and 'symbolic analysts,' like engineers or lawyers, who use information at the top with a shift from the middle to the other two groups as the economy advances. The role of gender is examined specifically through the changes in, and linkages between, educational attainment and the occupational structure of the Malaysian labour force. The analysis is based on labour force data from a two per cent sample of the 2000 Population Census, the Ministry of Higher Education's Graduate Tracer Study for 2007 and 2011, and labour force surveys for 1985, 1995 and 2005.⁸

This paper is organised in five sections. In the next section, we investigate the dynamics underlying gender, education and the labour force. The aim is to tease out the effects of gender on the linkage between education and occupation. The third section considers the effects of gender imbalance in education on efficiency of the labour market. The unemployment among, and the employment of, young people in the job market are explored. The following section reports on changes in education, occupation and gender linkages across time. Logistic regression is used to determine changes in the net effects of education on the probability of males being employed in the workforce. The paper concludes with a discussion on the policy implications of the foregoing analysis.

⁵ In higher education alone, the Ministry of Higher Education's National Higher Education Fund Corporation (NHEFC) was reported to have extended loans and subsidies amounting to RM15.1 billion to almost 800,000 students between 1997 and 2005 (World Bank 2007).

⁶ Data from Ministry of Education, Educational Statistics, various years. The figure for tertiary enrolment is for 2010 and is from data.worldbank.org.

⁷ The achievement gap in public examinations between males and females has been increasing over time. See Ministry of Education, Malaysia 2012: Exhibit 3-26.

⁸ We are grateful to the Department of Statistics, Malaysia and the Ministry of Higher Education (now the Ministry of Education), Malaysia for providing us with the data used in this study.

2. Dynamics of Gender, Education and Labour Force

The female advantage in educational attainment was already observable in the labour force by year 2000 (Lee and Nagaraj 2006). Furthermore, while the overall female labour force participation increased from 37.2 per cent in 1970 to 46.5 per cent in 2000, it was much higher at 69.4 per cent among those with tertiary education (Tey 2006). How has rising educational levels impacted the occupational structure of the labour force and how does gender imbalance in favour of women impact this dynamic?

In seeking the answers to these questions, we focus on the attainment of tertiary education and argue that this is important for the following reasons. First, the effective deployment of university graduates is essential for a smooth transition to a knowledge economy and hence to move beyond middle-income status. Second, the gender imbalance is greatest for tertiary education and the transition from university to work is of particular interest, especially from a gender perspective. Impact of gender on the linkages between education and employment is likely more easily established for tertiary education since education at that level usually brings greatest gains in access to employment in the labour market.

We undertook an analysis based on tertiary education attainment⁹ and occupation for working individuals¹⁰ aged 25-54 across birth cohorts based on a two per cent sample from the 2000 Population Census.¹¹ There are advantages to analysing birth cohorts at a point of time, not the least being that the structure of the labour force reflects the structure of the economy at a point of time and the opportunities available for labour force participation for both men and women across the birth cohorts. Since individual choice, family formation and experience may dictate how and when a woman participates in the workforce over her lifetime, it could be argued that it would be more appropriate to examine census data for the same age group across time. However, cohort analysis controls to a certain extent the shifting opportunities for, and society's changing views of, women's labour force participation. This is an important critical consideration given the dramatic changes in educational and economic opportunities that have been observed across time. Accordingly, we base our conclusions on a careful analysis of differences across birth cohorts.

Rising educational attainment at the tertiary level has had a salutary effect on female participation in the workforce. First, we note the rapid gain in female educational attainment: while the percentage with tertiary education among individuals aged 25-54 for the youngest cohort is almost double that for the oldest cohort, the corresponding percentage for females is almost triple (Table 1). Then we note that tertiary education increases female participation considerably: 94.1 per cent of males and 45.0 per cent of

⁹ These are persons who had a certificate or diploma in trade or technical education, a certificate or diploma from a polytechnic or college, a degree, advanced diploma, graduate certificate or post-graduate degree.

¹⁰ Working individuals refer to employers, employees, self-employed, unpaid family workers and workers with unknown status.

¹¹ It would have been useful to examine further changes across time with a two per cent sample of the 2010 census. However, this was not available at the time of writing.

Table 1. Educational attainment and work participation among individuals aged 25-54 by birth cohort and gender, 2000 (percentages)

Gender	All individuals aged 25-54	Birth cohort		
		1966-1975	1956-1965	1946-1955
With tertiary education				
All	16.4	20.9	15.6	10.1
Male	18.1	21.5	17.9	13.0
Female	14.7	20.3	13.1	7.0
Working				
All	69.8	72.8	70.3	64.0
Male	94.1	94.0	96.1	91.4
Female	45.0	51.8	44.0	34.6
Working, with tertiary education				
Male	95.9	94.4	98.0	95.4
Female	80.4	82.0	79.1	72.2
Working, without tertiary education				
Male	93.7	93.9	95.7	90.8
Female	38.9	44.0	38.7	31.4

Source: Computed from a 2% sample of the 2000 Population Census.

females were working, but among those with tertiary education, 95.9 per cent of males and 80.4 per cent of females were working. Finally, we observe that across cohorts, for those with tertiary education, the percentage working increases as the cohort gets younger and the increase is much greater for females than for males. This also tells us that those with tertiary education, whether males or females, are more likely to work over a longer period of their life. There remains, however, a gender gap even for the youngest cohort (94.4% for males, 82.0% for females) among those with tertiary education. The proportion of males working is in line with the experience of most other countries in the world, but the proportion of women at work is by far the lowest in Southeast Asia (ILO 2008: Annex Tables II.2.1-II.3). From a human resource perspective, the existence of a large number of highly trained persons outside the labour force represents a huge pool of idle human capital.

Has improving female educational attainment led to greater female participation across a greater variety of occupations? To answer this question, we first establish how work participation disaggregated by occupation differs by gender and tertiary education. About 1 in 3 workers were female, and the highest percentages of females were in clerical occupations and professional occupations (Table 2). The lowest percentages were for legislators, senior officials and managers and craft and related trades workers. About 1 in 5 workers aged 25-54 had tertiary education, the highest percentage for professionals and the lowest for skilled agricultural and fishery workers. If we regroup the occupational categories by percentage with tertiary education, 27.8 per cent of the workforce was in

Table 2. Occupational distribution and percentage with tertiary education among working individuals aged 25-54, 2000

Occupational Categories	All working individuals aged 25-54	Percentage female	Percentage with tertiary education
Legislators, senior officials and managers	7.9	22.2	40.8
Professionals	6.8	41.7	82.0
Technicians and associates	13.1	37.7	37.8
Clerical workers	9.2	60.9	17.5
Service workers and shop and market sales workers	12.6	31.8	13.0
Skilled agricultural and fishery workers	13.5	22.9	3.7
Craft and related trades workers	9.2	16.6	9.7
Plant and machine operators and assemblers	14.4	26.6	8.0
Elementary occupations	13.2	32.5	13.1
Total	100.0	31.9	20.9

Source: Computed from a 2% sample of 2000 Population Census

the first three occupational categories, legislators, senior officials and managers, professionals, technicians and associates (Tier 1 occupations), where the percentages with tertiary education were the highest (more than 28%). About 44.3 per cent were in the occupational categories, clerical workers, service workers and shop and market sales workers, craft and related trades workers and elementary occupations (Tier 2 occupations), where percentages with tertiary education ranged between 10 and 18 per cent. Another 27.9 per cent were in the two occupational categories, plant and machine operators and assemblers and skilled agricultural and fishery workers (Tier 3 occupations), where the percentages with tertiary education were the lowest (less than 10%).

Rising educational attainment at the tertiary level has had a positive effect on female participation across all occupational groups. The female percentage shows an increase in all three occupational groupings with and without tertiary education as the birth cohort gets younger, but the change is greatest for the Tier 1 occupations and with tertiary education (Table 3). Among the youngest cohort, about 2 in 5 workers in Tier 1 and Tier 2 occupations are women. For women with tertiary education, almost 1 in 2 in Tier 2 occupations are female. There is an increased presence of females in occupations that have a high proportion of the workforce with tertiary education; however it is not as great for Tier 1 occupations as it is for Tier 2 occupations.

Table 3. Percentage female among working individuals aged 25-54 by occupational categories, tertiary education and birth cohort, 2000

Gender/occupational categories	All working individuals aged 25-54	Birth cohort		
		1966-1975	1956-1965	1946-1955
With tertiary education	39.9	45.2	36.8	29.1
Tier 1	38.5	45.3	34.2	25.5
Tier 2	47.2	51.2	44.6	39.1
Tier 3	26.0	24.9	28.7	24.7
Without tertiary education	29.8	32.3	29.5	25.7
Tier 1	30.1	34.0	29.3	25.6
Tier 2	33.1	36.1	32.2	28.7
Tier 3	24.7	25.7	25.6	22.2

Source: Computed from a 2% sample of the 2000 Population Census

Table 4. Percentage with tertiary education among working individuals aged 25-54 by occupational categories, gender and birth cohort, 2000

Gender/occupational categories	All working individuals aged 25-54	Birth cohort		
		1966-1975	1956-1965	1946-1955
Male	18.5	21.6	18.3	13.5
Tier 1	46.2	53.1	44.6	36.7
Tier 2	10.7	12.4	10.6	7.9
Tier 3	5.8	8.1	5.1	3.2
Female	26.2	26.7	23.5	15.6
Tier 1	55.7	64.6	50.2	37.2
Tier 2	17.5	20.6	16.2	11.6
Tier 3	6.3	7.9	6.0	3.7

Source: Computed from a 2% sample of the 2000 Population Census

An increase in the quality of the workforce over time is evident since the percentage of working males and females with tertiary education in all occupational categories is higher in the younger birth cohorts (Table 4). The gain across cohorts is greatest for Tier 3 occupations. The percentage is greater for females than males across all occupational categories. The gain in educational levels across cohorts is slightly higher for Tier 1 and Tier 2 occupations for females compared to males and slightly higher for Tier 3 occupations for males compared to females. This is also consistent across all three birth cohorts. Indeed, across cohorts the ordering of these percentages across occupations is mostly the same suggesting that the gains in education have not been limited to some occupational categories.

Rising educational attainment has also led to changes in the occupational distribution. While most workers are in Tier 2 occupations, females are more likely than

males to be in Tier 1 occupations. Across birth cohorts, the percentages in Tier 1 occupations increase for females but not for males. The percentages for Tier 3 occupations decrease for both males and females. For males, the corresponding increase comes in Tier 2 occupations, but for females, the corresponding increase comes from Tier 1 occupations. In contrast, among those with tertiary education (not shown), males were more likely (66.2%) than females (62.4%) to be in Tier 1 jobs, while females were more likely (32.6%) than males (24.3%) to be in Tier 2 jobs. As the economy advances and educational attainment improves, the occupational distribution shows a shift to occupations that require tertiary education, but this change is greater for females.

Has increased tertiary attainment led to greater segmentation in the occupational structure? Duncan's socio-economic index (Duncan and Duncan 1955)¹² was used to measure segregation in terms of tertiary versus non-tertiary education. The index was computed across all occupations at the three-digit level (Table 6). The index was a high 49.3 for all those working aged 25–54. This means that 49.3 per cent of those with tertiary education would have to change jobs with those with no tertiary education for the distribution to be the same across all the occupations. There is greater segmentation in the Tier 1 occupations and less segmentation in the Tier 3 occupations, as is to be expected since Tier 1 occupations were those occupational categories with the highest percentage of workers with tertiary education. However, segmentation between the oldest and the youngest birth cohorts shows an increase for Tier 1 occupations and a decrease for Tier 2 and 3 occupations. For the economy as a whole, the index of segmentation is greater the more recent the cohort, suggesting that there is more segmentation in the labour market today. Comparing males and females, segmentation has increased sharply for females but has not changed as much for males.

Table 5. Occupational distribution of working individuals aged 25-54 by gender and birth cohort, 2000

Gender/occupational categories	All working individuals aged 25-54	Birth cohort		
		1966-1975	1956-1965	1946-1955
Male				
Tier 1	26.0	25.7	27.0	25.0
Tier 2	44.1	44.6	45.2	41.6
Tier 3	29.9	29.7	27.8	33.5
All occupational categories	100.0	100.0	100.0	100.0
Female				
Tier 1	29.1	31.7	28.0	24.2
Tier 2	49.9	49.8	50.5	48.7
Tier 3	21.1	18.5	21.5	27.1
All occupational categories	100.0	100.0	100.0	100.0

¹² A value of 0 indicates a completely segmented market with some occupations having workers with tertiary education only and other occupations with workers with non-tertiary education only. A value of 100 indicates that those with tertiary education can be found in all types of occupations.

Table 6. Duncan's socio-economic index for tertiary education for working individuals aged 25-54 by birth cohort, 2000

Occupational categories	All working individuals aged 25-54	Birth cohort		
		1966-1975	1956-1965	1946-1955
All	49.3	51.2	49.8	46.2
Tier 1	47.3	46.3	50.5	43.9
Tier 2	22.2	21.9	25.0	22.9
Tier 3	11.6	14.5	13.0	17.7
Male	48.8	49.4	50.0	48.8
Tier 1	46.4	45.9	49.1	45.2
Tier 2	14.7	14.2	19.1	17.6
Tier 3	16.7	15.5	19.2	22.5
Female	50.3	50.9	50.6	45.5
Tier 1	47.7	47.6	52.8	43.3
Tier 2	29.2	30.7	32.7	27.1
Tier 3	14.4	25.0	14.6	14.8

Source: Computed from a 2% sample of 2000 Population Census. Calculations based on the 3 digit occupational classification.

The above analysis has shown that greater educational attainment leads to a more qualified workforce across all occupations in several ways. First, tertiary education keeps people (males or females) working longer. That is, while the percentage working decreases for older cohorts, the decrease is much smaller for those with tertiary education. Second, tertiary education brings women into the workforce reducing the gender gap among those working. The percentage of females aged 15–24 with tertiary education working relative to that of males working increased the younger the cohort. Further, the decrease in the percentage working for older cohorts is much smaller for women with tertiary education. Third, if we think of Tier 1 occupations broadly as comprising those that require use of information, and Tier 2 occupations broadly as those related to the provision of services, the changes in the occupational structure of the economy across cohorts does suggest a transition according to Reich's (1991; 2005) characterisation of a three-tiered work force for a knowledge economy.

The participation of more educated women in the workforce across all occupations has also enhanced the quality of labour. Tertiary education has brought women into a variety of jobs. Women's participation has increased across all occupational categories, but especially in Tier 1 jobs. While male dominance in occupations like legislators and craftsmen may have cultural roots (Ahmad 1998; Antecol 2000), women have made significant gains in these occupational categories. Among the youngest cohort, just under half (48.1%) of the professionals (mostly teaching, health and finance) were females.

However, optimism over these advances is tempered by several concerns. Although tertiary education has a positive effect on female work participation, about one in five females with tertiary education remains outside the workforce. Among those with tertiary education who work, the increase is greater in Tier 2 jobs. Job segmentation by tertiary

education was also greater for females than males especially for the youngest cohort.¹³ More importantly, it appears that gains for women observed above had been at the expense of the males. The occupational distribution for males does not show the progress towards Tier 1 jobs that the distribution for females shows. Moreover, the decrease in the percentage employed in Tier 3 occupations across birth cohorts was lower for males. Given the dominant presence of males in the workforce and the lag in their educational attainment compared to females, and given the lower likelihood for work participation among females even with tertiary education, the quality of the labour force in the long run may be inadequate for a successful transition to a knowledge economy.

3. Gender, Education and Efficiency of the Labour Market

Given the enormous investment (personal, private and public) in higher education, ensuring effective utilisation of the output of tertiary education is an important concern.¹⁴ Equally important is the job market for young entrants with education below the tertiary level. These two concerns are confounded by gender and have a direct impact on the efficiency of the labour market. To examine these issues, the ensuing discussion covers three distinct sub-groups, those aged 20 and above, those aged 15-24 and specifically degree-holders (or graduates).¹⁵ The data used come from a two per cent sample of the 2000 Population Census and the Ministry of Higher Education's Graduate Tracer Survey.¹⁶

How effective is the utilisation of output of tertiary education? We note that the decisions on whether and where to work and the opportunity for employment differ by gender and educational attainment. For individuals aged 20 and above in the labour force in 2000, females (57.4%) were more likely than males (12.7%) to be outside the labour force, even if they had a degree (19.2% compared to 9.6%, respectively). Female graduates were much more likely to be employees (66.3%) compared to females in the overall population (29.4%). Furthermore, female graduates (41.3%) were more likely than male graduates (25.7%) to be public sector employees, while male graduates (68.6%) were more likely than female graduates (51.9%) to be in the private sector or in their own business. Male graduates were also less likely (1.9%) than female graduates (3.3%) to be unemployed, although overall, males (2.5%) were more likely than females (1.6%) to be unemployed.

Female graduates are less likely to work compared to male graduates, more likely to be unemployed if they look for work, and when they do work, are more likely to be employees and more likely to be working for the public sector. Some of these gender differences may reflect differences in the field of study, and therefore access to available

¹³ That gendered educational choices can lead to segmentation in the labour market has also been raised in the context of other countries. See AFPPD (2007), Pekkarinen (2012).

¹⁴ Those with tertiary education who did not enter the workforce, described earlier, although also contributing to the inefficiency of labour, are a separate group. Collectively, they represent idle human capital.

¹⁵ Graduates are those who have at least a degree. Of those aged 25–54 with tertiary education in year 2000, 32.7% had at least a degree.

¹⁶ This is an annual survey that is conducted online on graduating students in all local universities approximately three to four months after the completion of their degree programs.

jobs. The Tracer Survey shows that more than half the female graduates in 2007 and 2011 were in arts and education fields, while more than half the males graduated with degrees in technical or ICT fields, although there is a small but noticeable increase in the percentage of women in science and technical fields between 2007 and 2011 (Table 7).

The second concern is that of employment opportunities for the young labour market entrants. Given the lower proportion of males in tertiary education, it is not surprising that these young people were looking for work or were working at a younger age than the females. Males aged 15-24 were more likely to be working (44.5%) than females aged 15-25 (34.4%). In the same age group, males were more likely to be unemployed (9.0%) than females (7.3%). In fact, of the 3.2 per cent aged 20 and above who were unemployed, 62.1 per cent were between the ages 15–24 and 59.4 per cent were males. The majority of the unemployed aged 15-24 (88.2%) and working aged 15-24 (85.6%) had at most lower secondary education.

The findings suggest higher unemployment among female graduates and among males without a degree. The former suggests the possible “mismatch” between qualifications and job availability, and is borne out in several ways. First, not only was the percentage unemployed greater for female graduates, as the Tracer Survey shows, they were also more likely to be waiting for placement (Table 8). Second, male graduates were more likely to be in permanent positions while female graduates were more likely to be in temporary positions, another indication of their disadvantaged situation at the point of entry into the labour market. Third, male graduates were more likely to be in Tier 1 occupations relative to female graduates, while female graduates were more likely to be in Tier 2 occupations than male graduates. Fourth, differences in employment and occupation between males and female graduates observed earlier argue for corresponding earnings differentials by gender. This was indeed the case. A higher percentage of females compared to males earned less than RM1000 per month, while a lower percentage compared to males earned more than RM2500 per month.

As far as males are concerned, two explanations can be advanced for young people with lower levels of education who are working, one benign and the other a cause for concern from a policy perspective. First, young people may engage in these jobs while continuing their education. And second, they may be dropouts from the education system.

Table 7. Percentage distribution of university graduates and percentage female by field of study and gender, 2007 and 2011

Field of study	2007			2011		
	Male	Female	% Female	Male	Female	% Female
Arts	26.4	47.9	70.5	32.4	49.8	67.2
Science	8.6	13.6	67.6	8.5	18.3	74.0
Technical	47.5	16.6	31.5	43.2	15.2	32.0
ICT	10.9	9.7	54.0	10.8	7.6	48.5
Education	6.6	12.2	70.9	5.1	9.1	70.3
All graduates	100.0	100.0	56.9	100.0	100.0	57.1

Source: Graduate Tracer Survey, Ministry of Higher Education Malaysia

Table 8. Percentage distribution of current status of university graduates on completion of study, 2007 and 2011.

Current status	2007		2011	
	Male	Female	Male	Female
Percentage of graduates 4 months after graduation				
Waiting for job placement	2.7	6.5	6.5	8.3
Unemployed	24.6	27.9	22.2	26.2
Percentage of graduates by employment tenure ¹				
Permanent employment	63.7	58.2	63.8	59.5
Temporary employment	13.2	20.0	12.9	18.8
Percentage in occupational categories				
Tier 1	75.2	61.5	79.4	67.8
Tier 2	18.2	36.3	19.3	31.7
Tier 3	6.6	2.2	1.3	0.5
Monthly income from employment				
RM500 & below	4.2	6.1	3.2	4.2
RM501 - RM1000	19.9	25.1	8.0	14.7
RM2501 and above	19.6	14.2	21.9	14.8

¹ Besides permanent and temporary employment, the other tenure categories are contract-, self-, and family employment.

Source: Graduate Tracer Survey, Ministry of Higher Education Malaysia

Young people with lower levels of education also have difficulty finding jobs. One explanation for this could be due to a “crowding out” effect. Our findings about the lower quality of employment of female graduates described earlier and the higher index of segregation observed for females previously suggest that this is the case. That is, jobs that do not require higher levels of education may be given to female graduates.

4. Education-Occupation-Gender Linkages Across Time

The decline in tertiary attainment of males has been gradual, and it would be interesting to see how gender-education-occupation linkages have changed across time. In order to explore the changes in the effect of educational attainment and occupation across time, a logistic regression is used to predict the probability that a worker is male. The data is from the labour force surveys for 1985, 1995 and 2005. Since universal secondary education (eleven years from age 7) was introduced in 1992, 1985 represents the year selected before this policy was in place, 1995 the year selected soon after and 2005, 13 years after the policy was introduced. Since the impact on education is seen primarily in the long run, these selected years also provide an overview of the impact of changes in educational policy on the labour market. Two models were estimated for each year. Model 1 compared, by gender, tertiary attainment netting out the effect of experience (measured as age and age squared). Model 2 added in the occupational structure netting out the effect of the economic structure (industries that employed tertiary workers) and

two labour market indicators known to differ by gender (hours worked and whether never married).

Model 1 is given by

$$P(y_i=1) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{2i}^2 + \varepsilon_i \quad (1)$$

where $y = 1$ if the worker is male, 0 otherwise

$X_1 = 1$ if the worker has tertiary education, 0 otherwise

$X_2 = \text{age}$

$\varepsilon = \text{error term}$

Model 2 is given by:

$$P(y_i=1) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{2i}^2 + \beta_4 X_{3i} + \beta_5 X_{4i} + \beta_6 X_{5i} + \beta_7 X_{6i} + \beta_8 X_{7i} + u \quad (2)$$

where y , X_1 and X_2 are as defined for Model 1

$X_3 = 1$ if the worker is in a secondary occupation (Clerical and related worker, service and sales workers), 0 otherwise

$X_4 = 1$ if the worker is in a tertiary occupation (Professional, technical and related, administrative and managerial), 0 otherwise

$X_5 = 1$ if the worker is in a tertiary industry (industries which employed more workers with tertiary qualifications than average), 0 otherwise

$X_6 = \text{hours worked}$

$X_7 = 1$ if the worker had never married, 0 otherwise

$\varepsilon = \text{error term}$

The results for Models 1 and 2 are presented in Table 9 in terms of the odd ratios, which are the exponentiated coefficients. The odds ratio for the dummy variable X_2 , for example, provides an estimate of the ratio of the probability of the worker with tertiary education being male over the probability of the worker with tertiary education being female. Table 10 provides the predicted probabilities based on Model 2 of the worker being male for selected characteristics.

The variables that are important in distinguishing male and female participation in the labour force changed between 1985 and 2005. First we note that tertiary is a significant predictor of the probability that the worker is male only for 1985 and 1995 in Model 1, and only for 1995 in Model 2. Furthermore, Model 2 performs marginally better in 1985, but performs much better in 1995 and 2005, than Model 1 in predicting the probability of a worker being male. In 1985, tertiary education is important in predicting the probability of a worker being male in Model 1 but is no longer important when type of labour force participation (that is, occupation and industry) is taken into account in Model 2. In fact, type of labour force participation predicts the probability of a worker being male to be much higher than it actually is. In contrast, in 1995, the odds of a worker with tertiary education being male increases when type of labour force participation is taken into account. By 2005, the odds that a worker with tertiary education is male are not significantly different from 1, even when type of labour force participation is taken into account. In fact the predicted probability that a worker with tertiary education is male is very close to the actual, and is close to 0.5. In 2005, it is type of labour force participation that predicts the odds of being male. In particular, males were less likely

Table 9. Summary of logistic regression predicting the probability that a worker is male, 1985, 1995 and 2005

Variables	1985	1995	2005
Model 1			
Tertiary Education	1.499**	1.706***	1.067
Age	1.067***	0.990	0.963**
Age Squared	0.999**	1.000	1.040*
Likelihood Ratio	16.17***	8.51**	7.21**
Percentage correctly classified	65.1	52.1	52.9
Model 2			
Tertiary Education	1.191	2.048***	0.886
Age	1.089***	1.009	0.954
Age Squared	0.999***	1.000	1.001*
Secondary Occupation	0.496***	5.847***	0.388***
Tertiary Occupation	0.530***	0.668***	0.848
Tertiary Industry	1.399***	1.977***	1.847***
Hours Worked	1.016***	1.008	1.018***
Never Married	1.014	0.948	1.014
Likelihood Ratio	91.14***	76.14***	99.8***
Percentage correctly classified	66.5	63.6	66.9

Notes: * Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level

Source: Based on Labour Force Survey data.

Table 10. Probability of male among the employed with selected characteristics, 1985, 1995 and 2005 (based on Model 2)

	1985	1995	2005
Tertiary Education			
Actual probability	0.554	0.558	0.506
Predicted probability	0.700	0.631	0.483
Tertiary Occupation			
Actual probability	0.579	0.603	0.653
Predicted probability	0.558	0.457	0.676
Tertiary Industry			
Actual probability	0.742	0.689	0.740
Predicted probability	0.725	0.718	0.765

(relative to females) to be in secondary occupations, but more likely to be in tertiary industries.

The results support our earlier findings. There are changes in the occupational structure as a result of changes in tertiary attainment, and that these changes have a gender dimension to them. Increased access to education in the short run led to greater gains among males, but in the long run, females made more rapid gains to level the playing field in the labour force by 2005. However, males still dominate in tertiary occupations and in industries that employ more tertiary educated persons, while females

are more spread out in lower level occupations and in industries that employ fewer tertiary educated workers than average.

5. Conclusions and Implications For Policy

The above analysis paints a mixed picture of the impact of gender imbalance in educational attainment on the labour force. On the positive side, the expanding opportunities for education in Malaysia have led to a rising educational attainment of the populace, especially among the younger cohorts. Thus, even as expanding economic opportunities have increased demand for educated workers, the supply side has also seen gains in educational attainment across all occupations for both men and women. The analysis supports society's general perception that higher education enables greater labour force participation but also shows that higher education increases labour force participation by extending an individual's working life. Improved access to education in the short run led to greater gains among males, but in the long run, females made more rapid gains to level the playing field in educational attainment. The gain in the educational attainment of women has led to their greater participation in the workforce, and in a variety of occupations including professional positions especially in health, education and finance. More importantly, the gains in educational attainment for both males and females have enabled changes in the occupational structure towards that of a knowledge economy.

These positives need to be tempered by several concerns. First, the decision on the field of study, whether to work or not, as well the decision of where to work, all differ by gender and these effects were seen in the labour force. These findings support what has been observed in other studies: gender affects the decision to work (Lee and Nagaraj 2006; Subramaniam *et al.* 2010), occupational choices (Amin and Alam 2008; Tsiang 1991), hours of work (Goh 2004); career patterns (Kuppusamy *et al.* 2009; Quek and Chang 2009) and earnings (Milanovic 2006; Goh and Rohana 2008).

Despite accounting for over half the enrolment in educational institutions, females make up only about a third of the workforce. Among those with tertiary education, the proportion doubles, but nevertheless it is lower than that of males. Labour supply will be affected to the extent that female workers are less prepared to work in localities far away from family or are constrained by family demands. Given the dominant presence of males in the workforce and the lag in levels of educational attainment among males compared to females, in the long run the quality of the labour force may be a major impediment to a successful transition to a knowledge economy.

Second, the female advantage in terms of tertiary enrolment does not necessarily translate directly into advantageous participation in the labour market. Although women are more likely than men to have a university education, female graduates are also more likely than male graduates to be in lower paying jobs or to be unemployed. Female graduates who are employed tend to fill clerical positions, or work in the public sector or in jobs in industries that employ fewer workers with tertiary education on average. Segmentation in the job market characterised by the attainment of a degree, as shown by Duncan's socio-economic index, is much greater for women than for men, suggesting that a wider variety of occupations require degrees of women compared to men. It is possible that females graduates in Tier 2 and Tier 3 occupations are in new types of jobs

made possible by a knowledge economy that are suited to women (Mellström 2009). It is unclear though that a degree is required for these positions. Furthermore, males have an advantage in tertiary occupations and in industries that employ more tertiary educated persons perhaps because of choice of subjects.

Third, a disquieting finding emerges when examining the world of work of young labour market entrants, both males and females. For females with degrees, there is the concern of unemployment or of employment in lower paying occupations. Especially for those without tertiary education, unemployment is a concern exacerbated by the fact that they compete with degree holders for Tier 2 and Tier 3 occupations. While it is not surprising to find young market entrants having a greater presence in primary and secondary than in tertiary occupations, our gender analysis points to lower education attainment rather than continuing education as the proximate cause. Given their strong presence among the unemployed, it is imperative that immediate attention be directed to policies that address the need of this group with lower educational attainment.

What might account for the lower female representation in the workforce? One possibility is discrimination in the workplace against females, reflected most prominently by the much lower average salaries because of their concentration in relatively low-paying occupations.¹⁷ Even in the public sector in which they dominate by weight of numbers, they are found mainly in the 'female occupations' of teaching and nursing, but are under-represented at decision-making levels. Further, the greater likelihood of female university graduates either being unemployed, in insecure temporary or contract work speaks to their disadvantage in the workplace (see, for example, Ministry of Women and Family Development 2003: ix). The result is not only social injustice based on gender but also inefficiencies in the Malaysian labour market (see also Ahmad 199: 37-40). It is therefore not surprising that Malaysia's gender gap ranking is a low 98 (out of 134) in the Global Gender Gap Index, a deterioration compared to 2006 (WEF 2010).¹⁸

These findings have major implications for policy. In the area of human resource planning, there is a lack of recognition of the implications of gender imbalance. There is a belief, implicit in the MDG and also some empirical support (e.g. Hoa 2005), that better female education contributes to growth to the same extent as the gain in education. As the Malaysian experience shows, although the educational system has achieved gender parity, a large proportion of women remain outside the workforce. And of those in the workforce, females are reluctant to work in localities far away from family or are constrained by family and marital demands. These factors could serve to constrain labour market efficiency and ultimately productivity. And despite the focus on women in successive Malaysian development plans, whatever policies that are in place have not been sufficiently family-friendly to enable females to realise their potential both personally and in terms of their contribution to development.

¹⁷ Gender discrimination occurs not in the form of lower wages for females in the same jobs but in the form of females predominating in lower paid occupations (Fernandez 2007). In 2010, females earned about 76% of what males earned in similar occupations, but only 42% of what males earned overall (WEF 2010).

¹⁸ For 2010, Malaysia, 98th out of 134 countries, is ranked below Cambodia (97), Indonesia (87), Vietnam (72), China (61), Thailand (57) and Singapore (56), but above South Korea (104) (WEF 2010).

The findings also have implication for education reform in Malaysia. Education is the single most important factor in stimulating the creation of a knowledge-based economy. Malaysia's education policy has been very successful in increasing enrolments of both males and females and in the process achieving gender parity. It has been much less successful in keeping children, especially boys, in school despite the provision of free education up to secondary education. It is time a concerted effort is made to educate all our children. In this context, education should encapsulate all activities intended to increase the knowledge and skills set of individuals. Another priority is to move away from gender-blind policies for education and focus on each child in the classroom. There is evidence that boys and girls are neurologically different and learn differently (Coates and Drive 2006; Galley 2002; Pollack 1999; Tyre 2006). A public education system that fails to incorporate the needs of each child it aims to educate needs urgently to be reviewed. Finally, the educational needs of the large number of youths with inadequate education already in the labour force should also be addressed.

In closing, it must be noted that this analysis of education and labour force dynamics from a gender perspective speaks primarily on issues in human resource allocation. It has not addressed government policies that are gender-focused nor assessed their efficacy. Other aspects of Malaysia's education system, such as quality, the mix between hard sciences and humanities, and the efficacy of teaching aids, including IT, have also not been addressed.

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