How the 1978 changes to the foreign domestic workers law in Singapore increased the female labour supply

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19. February 2013

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February 18, 2013

Abstract

In 1978, Singapore was the first country to introduce legislation allowing foreign domestic workers (e.g. maids) to work in the country with special visas. Singapore, with its liberal wage policy (no minimum wage), is also the best quasi-natural experiment in determining how a reduction in the cost of domestic work increases the supply of highly skilled female workers. Though Singapore is often cited in the literature as a success story, there are no studies that try to quantify the impact of this legislation. In this paper, we use data from the census conducted between 1957 and 1990, and Singapore's Yearbook of Manpower Statistics between 1974 and 1985, to evaluate the impact of the 1978 legislation in terms of increasing the labour supply of Singaporean women. We compare the female labour supply before and after 1978, for young and older women, high and low-skilled women, and Singaporean-Malay versus Singaporean-Chinese women. We find that the labour supply of women affected by this policy increased by between 2.7% and 12.7%, consistent with previous findings.

Keywords: Gender; Labour Supply; Quasi-Natural Experiment; Singapore.

JEL Classification Numbers: J16, J61.

1   Introduction

The economic growth literature emphasizes the importance of education for economic growth. It is therefore not surprising that economists have turned their attention to factors influencing the supply of highly skilled workers. For instance, the works of Khananusapkul (2004), Kremer & Watt (2005), Cortes & Tessada (2011), Furtado & Hock (2010), Freire (2010) and Cortes & Pan (Forthcoming) have shown how low-skilled migrant women decrease the cost of domestic work and increase the labour force participation of local high-skilled women. Cortes & Pan (Forthcoming) is the only work to date to have looked at legislative changes in the early 1980s that allowed foreign domestic workers to work in Hong Kong under special visas. The authors find that the inflow of foreign domestic workers that followed led to an increase in the labour force participation of medium to highly skilled women with young (0 to 5 years old) children of 9% to 13% when compared with highly skilled women with older children (7 to 16 years old). While their study is quite comprehensive, they cannot attribute their findings to any particular law, as their period of analysis covers several changes in the foreign domestic worker legislation in Hong Kong.

Another successful case that is often cited is Singapore. In 1978, the Singaporean Government introduced changes to the Employment of Foreign Manpower Act (Chapter 91A), which allowed foreign domestic workers hired by Singaporeans to obtain visas to work legally in the country for a limited period of time. This law did not specify a minimum wage for these workers nor any other requirement (Yeoh *et al.* (1999)), nor are there any minimum wages for Singaporean workers. In 1986, the Singaporean government introduced the first changes to the rules concerning the hiring of foreign domestic workers, by requiring individuals to put up a bond of S$ 5,000. These changes also included provisions that limited the ability of foreign domestic workers to put down roots in Singapore (Yeoh *et al.* (1999)). These changes were followed by eight more restrictions on the hiring of foreign domestic workers, between 1987 and 2008. Despite this, the number of foreign domestic workers grew to 206,000 (out of a total of 1,197,900 foreign workers) in December of 2011, implying that more than one in six households in Singapore employ a foreign domestic worker (own calculations using Kim (2011) and of Singapore (2012)). Given this, the

period from 1979 to 1986 is the closest thing we have to a quasi-natural experiment.

While this policy and legislation is often viewed as having been successful in increasing the labour supply of highly skilled female workers (see for instance Hui (1997), Yeoh *et al.* (1999), Oishi (2005), Cortes & Tessada (2011), Freire (2010) and Cortes & Pan (Forthcoming)), this paper is, to the best of our knowledge, the first attempt to quantify its impact.

2 Empirical Evidence

We use a difference-in-difference strategy, with a linear probability model in order to avoid potential omitted variable bias (Neuhaus & Jewell (1993)). Our model is as follows:

$$P_{ijt} = \alpha_t + \delta_j + \beta D_{j,78} + \gamma X_{ijt} + \varepsilon_{ijt} \tag{1}$$

where P_{ijt} is a dummy variable indicating whether, at time t, individual i in group j has joined the the labour force; α_t are year dummies, δ_j are group dummies, $D_{j,78}$ is our variable of interest, a dummy equal to one for all years later than 1978 for the treated group, and X_{ijt} are other relevant individual characteristics. As pointed out by Blundell *et al.* (2007), in order to obtain unbiased estimates of the average treatment effect, we need to assume: (i) treatment (policy change) is exogenous, affecting the treatment group but not the control group; (ii) changes over time affect both groups in a similar fashion; (iii) the composition of each group remains the same over time.

A major challenge to our analysis is the availability of data. The Statistical Information Act (Chapter 317) allows for the collection of statistical data but only allows summary tables to be made publicly available. Since each cell of the summary tables is the average across the individuals in that group, we can use the model proposed by Donald & Lang (2007) and Hansen (2007) to estimate

$$LFPR_{jt} = \alpha_t + \delta_j + \beta D_{78} + \epsilon_{jt} \tag{2}$$

where $LFPR_{jt}$ is the labour force participation rate of women in group j at time t. Not only does aggregation avoid bias in our estimates of β but it also allows us to make use of all relevant publicly available data. However, as pointed out by Wooldridge (2007), the error term $\epsilon_{jt} = v_{jt} + \bar{\varepsilon}_{jt}$ (where v_{jt} are unobserved group and time effects while $\bar{\varepsilon}_{jt}$ is the group average of individual specific errors) is a weakly dependent (mixing) time series for all g. We begin by treating $\bar{\varepsilon}_{jt}$ as independent and allowing v_{jt} to follow an AR(1) process, which we can estimate using the OLS of Bertrand *et al.* (2004) with cluster-robust standard errors (where clusters are defined by years). Furthermore, we address our small sample size by bootstrapping our standard errors and obtaining small-sample-corrected confidence intervals for β. Finally, we allow for a general form for $\bar{\varepsilon}_{jt}$ and, using Hansen (2007), estimate equation 2 by fixed effects GLS with a general variance-covariance matrix.

Since the law placed no restrictions on who could hire a foreign domestic worker, everyone in Singapore was potentially treated. Therefore, our data do not allow us to identify average treatment effects. However, we can obtain a local average treatment effect by splitting our sample into a treatment and a control group according to the intensity of the treatment (so the treatment group received a higher degree of treatment). The availability of cross-tabulations limits how we can determine the control and treatment groups. Therefore, we begin by using the level of education, in a fashion similar to Cortes & Tessada (2011), Freire (2010) and Cortes & Pan (Forthcoming), under the assumption that highly skilled women have more to gain from entering the labour force. We define highly skilled women as those who have completed secondary education (similarly to Cortes & Pan (Forthcoming)), and categorize everyone else as low-skilled.

As Figure 1 shows, both the numbers of high and low-skilled women increased between 1974 and 1985. However, the numbers of highly skilled men and women increased more than the number of low-skilled workers after 1978, increasing their share in the total number of workers in Singapore (second half of Table 1). This was driven in part by the 1979

Singapore Government policy to move from low-value-added, labour-intensive industries, such as textiles and electronics, to high-value-added, knowledge-intensive industries, such as jet engines (Lee (2008)). This policy was achieved through large wage increases over a short period of time, with the National Wage Council (formed in 1972 to negotiate wages between unions, management and the Government) urging the private sector towards a wage increase of over 65% between 1979 and 1981 (Lee (2008)). Despite this and the international oil shock, Singapore continued growing at a 5% annual average between 1978 and 1985, the same rate as prevailed between 1974 and 1977 (Table 1).

Another reason for the increase in the fraction of highly skilled workers in Singapore was the focus on education early on in the country's history (it gained autonomy in 1959). This took the form of investment in building schools and other resources, as well as extensive efforts to train teachers (Lee (2008)). The results of this strategy can be seen in the second part of Table 2[1], where a large increase can be seen in the proportion of the adult population (15 years or older) with secondary and polytechnic/university education.

As a result, our estimates should be upward biased, as the increase in wages should not only lead to greater labour force participation but also to an increased likelihood of hiring a maid (being treated). We use tabulations by education (four groups: primary or less, secondary, upper secondary and university) between 1976 and 1986 to estimate β in column 1 of Table 3. We find that the legislation increased the labour supply of highly skilled women by 12.7% (this is only statistically significant in one of our models, at the 10% level), consistent with Cortes & Pan (Forthcoming).

We also define treatment and control groups according to age: (1) young (20 to 39 years old) and (2) older (40 to 59 years old). As pointed out by MaCurdy (1981), the wage elasticity of substitution is higher for an increase in the permanent or lifetime wage than for a temporary increase. Therefore, the increase in the net gain from work over a lifetime will be higher for younger women. However, there were other changes in the behaviour of younger people over this period, which could explain the increase in their labour participation compared

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[1] The Singapore Yearbook of Manpower Statistics does not provide a cross-tabulation of the total population by educational group. Therefore, we use the census results from 1970, 1980 and 1990 and obtain estimates for 1974 to 1985 by linear interpolation.

with older women, as Figure 2 and the first part of Table 1 show. During this time period women (as well as men) began marrying later and having less children (see last part of Table 2). This was amplified by government fertility policies, such as the introduction of the Family Planning and Population Bord (FPPB) in 1966. The FPPB led several campaigns to reduce fertility during this time period, including the legalization of abortion in 1969 (Lee (2008)) and the introduction of the Stop at Two campaign in 1970, in which low-skilled women with more than two children were fined. Another programme initiated during this period was the Graduate Mother's Scheme, in 1983, which incentivized educated women (those with an university degree) to get married and have children, while those with low educational levels where incentivized to have themselves sterilized (Yap (2003)).

These demographic changes could bias our estimates downwards, as the delay in having children increases the likelihood of participating in the labour force, while it reduces the likelihood of hiring a maid (being treated). We use tabulations for labour force participation by age from the Report on Labour Force in Singapore (the data is aggregated into four groups: 20-29, 30-39, 40-48 and 50-59 years old) between 1976 and 1986 to estimate β in column 2 of Table 3. As the results show, after 1978 young women increased their participation in the labour market by between 2.9% and 5.7% more than older women (all estimates are statistically significant). Though we obtain different point estimates for our three models, these are not statistically different.

Finally, we define treatment and control according to ethnic group: (1) Malaysian; (2) Chinese. As the first part of Table 2 shows, while Singaporean women of Chinese origin are more likely than those of Malaysian origin to join the labour force (before and after 1978), there is no such significant difference for Singaporean men of Malay and Chinese origin. This is due to the fact that over 99% of Singaporeans of Malaysian origin are Muslim. We would therefore expect Malaysian women to have a larger preference for domestic work (as oppose to working outside the household) and therefore, as pointed out by Killingsworth & Heckman (1995), to have a larger income elasticity of labour when compared with Chinese women (which implies that they have a bigger response to changes in the incentives to work and are therefore more likely to hire foreign maids). Therefore,

it is not surprising that the labour force participation of Malaysian women increased more than the labour force participation of Chinese women between 1957 and 1990, as Figure 3 and Table 2 show. However, part of the increase in the share of Malaysian women in the labour market could be driven by the Singaporean Government's migration policy, starting in 1970, which allowed the entrance of migrants to meet the labour force needs of a growing Singapore (Lee (2008)). These migrants initially came from Malaysia (Lee (2008)), potentially biasing our estimates upwards, as migrant women are more likely to join the labour market. We use tabulations by ethnic origin taken from the census results of 1957, 1970, 1980 and 1990 to estimate β in column 3 of Table 3. Our results show that, after 1978, women of Malaysian origin increased their labour supply by 7.8% more (statistically significant) when compared with the increase in the labour supply by women of Chinese origin after 1978. The extremely low sample size prevents us from estimating our GLS model.

3   Conclusion

Our results show that the legislation that allowed foreign domestic workers to migrate to Singapore after 1978 increased the female labour supply by between 2.7% and 12.7%, consistent with Cortes & Pan (Forthcoming). Considering the fact that Singapore had a more liberal labour market policy than Hong Kong regarding the hiring of foreign domestic workers, and given the potential upward bias of some of our findings, we suspect that the actual impact of the legislation in Singapore was smaller than that found for Hong Kong by Cortes & Pan (Forthcoming), but which we cannot prove since the data is not available. Nonetheless, our results point to a positive impact from this policy, while the successive restrictions and taxes imposed on the hiring of foreign domestic workers since 1986 could have reversed these gains.

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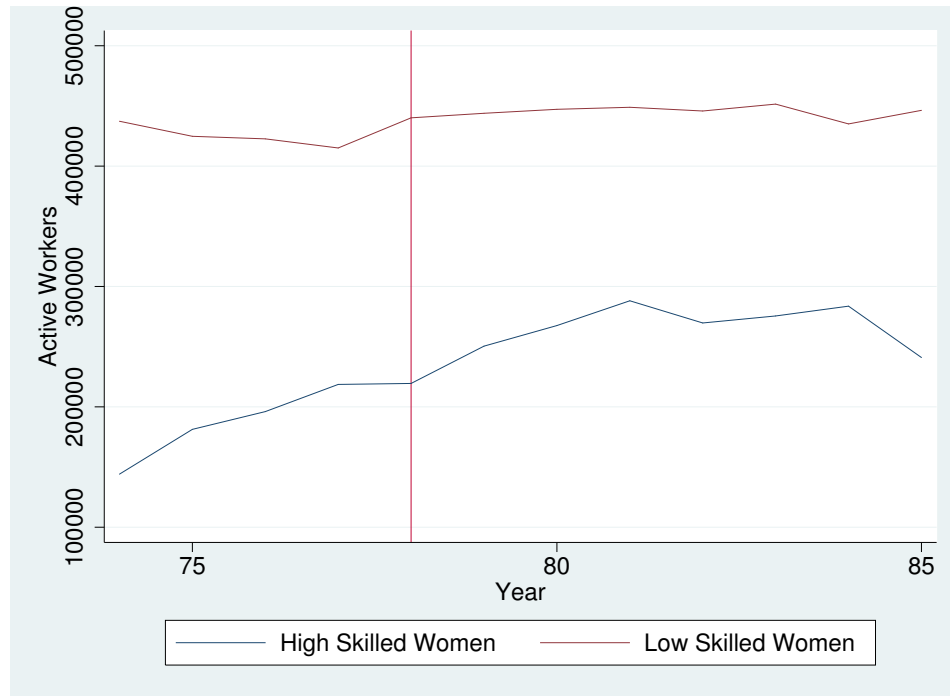
4 Appendix 1 - Figures

Figure 1: Number of highly skilled (completed high school or more) and low-skilled (incomplete high school or less) women working between 1974 and 1985. We assume that highly skilled women are more likely to benefit from the legislation as they have a higher potential benefit from joining the labour market. There is an increase in the number of highly skilled women working. However, the pattern does not seem to change after 1978, when the Foreign Domestic Workers Law was introduced.

[you need to change the axis labels on this chart to Highly Skilled and Low-skilled]
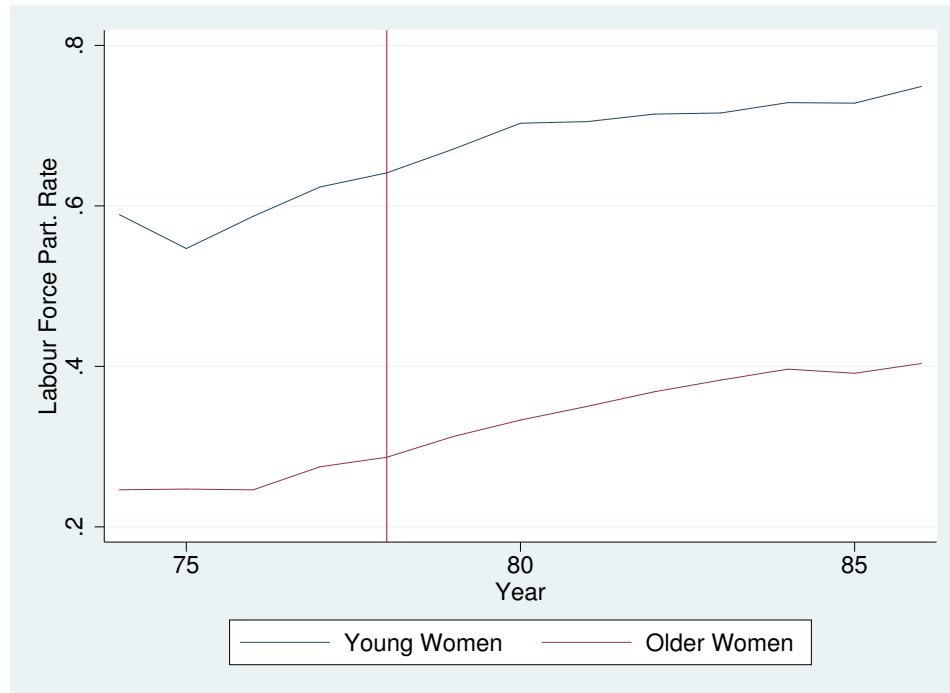
Figure 2: Labour force participation rate for young (between 20 and 39 years old) and older (between 40 and 59 years old) women from 1974 to 1985. We assume that young women are more likely to benefit from the legislation as they are more likely to have young children, and reap the benefits from labour market experience over a longer period of time than older women. We see a slight increase in the number of younger women working after 1978, when the Foreign Domestic Workers Law was introduced, but there is not much of a difference from the pattern for older women.
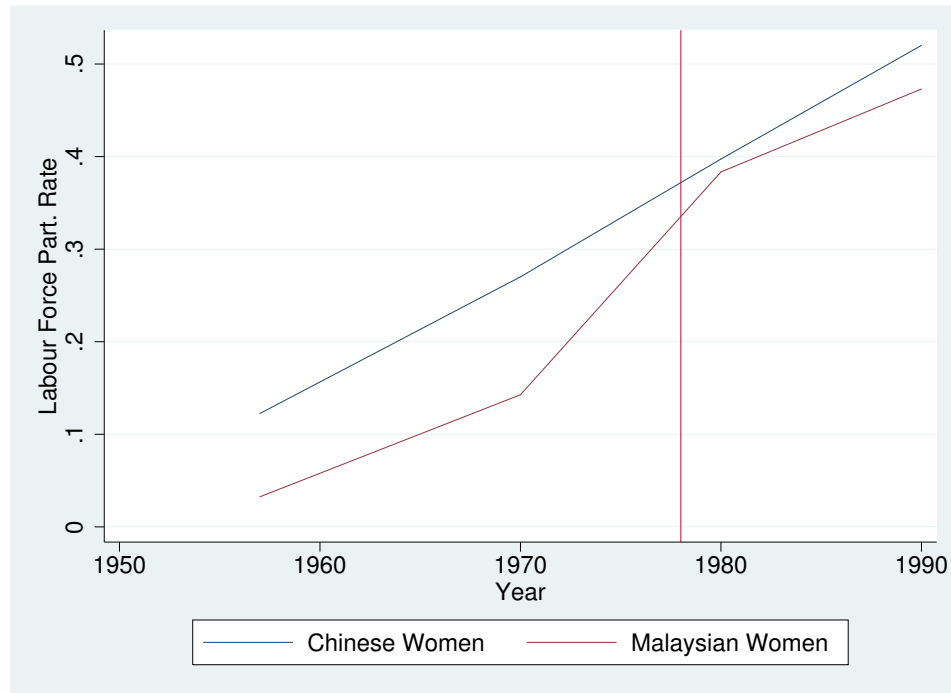
Figure 3: Labour force participation by Chinese and Malaysian women between 1957 and 1990. Assuming Malaysian women have a greater preference for domestic work, since they are more conservative, we would expect them to have a larger labour force price elasticity than Chinese women. We see that the increase in labour participation is higher for Malaysian women, although we should note that this increase started before 1978 when the Foreign Domestic Workers Law was introduced.

5   Appendix 2 - Tables

	Women		Men	
Years	**1974-77**	**1978-85**	**1974-77**	**1978-85**
Age group				
up to 19 y. o.	38.52%	38.53%	36.35%	36.52%
20 to 39 y.o.	36.95%	37.22%	37.04%	38.11%
	(48.46%)	(59.48%)	(94.91%)	(95.88%)
40 to 59 y.o.	18.55%	17.47%	18.86%	17.67%
	(20.85%)	(28.55%)	(89.99%)	(91.34%)
65 and above	5.98%	6.79%	7.75%	7.70%
Education				
Never attended school	30.68%	23.46%	35.06%	24.68%
Primary	27.15%	24.07%	34.61%	30.02%
Secondary	32.21%	43.80%	20.28%	30.34%
Upper secondary	7.82%	5.88%	7.04%	5.72%
Tertiary	2.13%	2.80%	3.00%	9.24%
Real GDP per capita growth	5.01%	4.87%		

Table 1: We report summary statistics for men and women before and after the change in the Foreign Domestic Workers Law in 1978, taken from the Singapore Yearbook of Manpower Statistics between 1974 and 1985. For age group, we report the proportion of the population 10 years old or above (after 1976 the lower bound for this statistic was changed to 15 years old). In brackets, we report, for each age group, the proportion active in the labour force. In the education section, we report the proportion of people active in the labour force who had (1) no education or had failed to complete primary school, (2) primary or incomplete secondary school, (3) upper secondary, and (4) university or vocational training (tertiary). The real GDP per capita growth was calculated using 2010 US dollar values of Singapore GDP obtained from the FRED (Federal Reserve Economic Data) database of the Federal Reserve Bank of St. Louis.

	Women		Men	
Year	**1957 & 1970**	**1980 & 1990**	**1957 & 1970**	**1980 & 1990**
Race				
Malaysian	13.42% (11.44%)	13.15% (42.96%)	13.43% (71.5%)	13.51% (75.08%)
Chinese	79.32% (25.08%)	76.75% (46.35%)	73.82% (69.35%)	75.29% (75.13%)
Indian	5.12% (12.92%)	6.28% (49.18%)	10.58% (82.11%)	8.11% (78.73%)
Other	2.14% (25.37%)	3.81% (64.19%)	2.17% (77.27%)	3.08% (86.66%)
	Women		**Men**	
Year	**1970**	**1980 & 1990**	**1970**	**1980 & 1990**
Education				
Never attended school	39.42%	18.93%	17.45%	20.99%
Primary	31.56%	35.55%	42.57%	44.71%
Secondary	25.49%	30.00%	34.08%	19.26%
Upper secondary	2.35%	9.37%	3.23%	6.91%
Tertiary	0.85%	6.15%	2.26%	8.12%
Other Statistics				
Fertility rate	3.07	1.825		
Marriage rate	67.3	64.9	51.6	53.8
Median age when first married	23.1	24.5	26.9	27.4
Migrants	2.94%	8.11%		

Table 2: We report summary statistics for men and women before and after the change in the Foreign Domestic Workers Law in 1978, using data from the 1957, 1970, 1980 and 1990 census. The first section shows the racial distribution of the population, with the proportion active in the labour force given in brackets below. In following section, we drop the 1957 census results, to provide detailed educational information, and the proportion of the population with different levels of education. The statistics on fertility rate, marriage and migrants were obtained from Kim (2011). The fertility rate is per female, the marriage rate is per 1,000 unmarried residents, and migrants is the proportion of migrants in the total population.

Local Average Treatment Effect of Foreign Domestic Workers Legislation			
	Labour Force Participation		
	High- and low-skilled women	Young and older women	Malaysian and Chinese women
OLS with robust S.E.	0.127 -1.65 [-0.042 ; 0.296]	0.029 (2.53)* [0.004 ; 0.054]	0.078 (3.24)* [0.001 ; 0.155]
OLS with bootstrapped S.E.	0.127 (1.65)+ [-0.019 ; 0.296]	0.029 (2.52)* [0.013 ; 0.064]	0.078 (4.62)** [0.054 ; 0.102]
GLS with with robust S.E.	0.127 (0.59) [-0.294 ; 0.548]	0.057 (2.80)** [0.017 ; 0.097]	
Time controls	Dummies	Dummies	Dummies
Number of years	12	12	4
Number of groups	4	4	2

Table 3: Local average treatment effect estimates of the inflow of foreign domestic workers after 1978 on labour participation by women in Singapore (β). In the first row, we estimate equation 2 with time and group fixed effects using OLS with cluster-robust standard errors (clustered by year), while in the second row we estimate our standard errors by bootstrapping and small-sample-corrected confidence intervals and in row three we estimate the same model using generalized least squares (GLS) with robust standard errors. In column 1, the treatment group is young women between the ages of 20 and 39 and the control group is older women between the ages of 40 and 59, while in column 2 the treatment group is women who have completed secondary school or more and the control group is low-skilled women (incomplete secondary education or less). Finally, in column 3, the treatment group consists of women of Malaysian origin while the control group is women of Chinese origin. T-statistics and z-statistics are presented in round brackets. + significant at 10%; * significant at 5%; ** significant at 1%. 95% confidence intervals reported in square brackets.