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# Providing child care

Christine HO
*Singapore Management University*, christineho@smu.edu.sg

Sunha MYONG
*Singapore Management University*, sunhamyong@smu.edu.sg

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Christine Ho, Sunha Myong

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# 10 Providing child care by Christine Ho and Sunha Myong[1]

## 10.1 Introduction

Women's economic empowerment has been hailed as one of the most remarkable revolutions in the past 50 years (Dunlop, 2010). Access to affordable childcare is one of the key determinants of fertility and maternal employment, with grandparents and governments often stepping up to provide much needed support to families. This chapter proposes a synthesis of the state of knowledge on child care and discusses policy relevant issues applicable to the Singapore context. Selected policies are documented and lessons from the international landscape are discussed.

The chapter discusses how child care costs may affect fertility and maternal labour supply in Section 10.2. Raising children incurs both direct costs in the form of child care and opportunity costs in the form of career costs. As women struggle to jungle between the pressures of raising children and contributing as breadwinners, many delay motherhood. The trade-offs between child care, maternal employment, and fertility are discussed. The feminization of child care also seems to be an important contributor to such pressure, especially in many Asian countries.

In Section 10.3, common child care support available to parents are documented and their implications on fertility and maternal labour supply are discussed. Child related support such as baby bonus and parental leave may help boost fertility. Formal child care subsidies may also help incentivize both fertility and maternal employment. Similarly, the availability of informal care support from grandparents and domestic helpers may also help boost both fertility and maternal employment.

Future directions for child care policy research are discussed in Section 10.4. Providing opportunities for greater gender equality in household child care may help increase the efficacy of child care policies in boosting fertility and parental labour supply. Such policies may include flexible parental leave coupled with campaigns to reduce the stigma associated with child care leave. Policies may also include formal and informal child care subsidies coupled with good quality child care.

## 10.2 Child care trade-offs

The costs of children comprise of both the direct cost of raising children and of the opportunity costs of time spent on child care (Becker, 1981). Estimates of the direct costs of raising one child in Singapore range from S$200,000 to nearly S$1 million (Hartung, 2016). Such costs may include child care fees during early childhood, schooling fees, and healthcare spending for children. It is estimated that parents in Singapore on average spend about S$1,500 per month over 20 years. Such costs are comparable to those in other developed countries. For instance, the direct costs of raising a child until age 17 (excluding college spending) have been estimated at around US$284,570 in the USA (Lino, 2017). Below, we focus predominantly on the trade-offs involved in raising children when they are relatively young, that is, when they are arguably in greater need of care.

[1]Christine Ho, Associate Professor of Economics, School of Economics, Singapore Management University, 90 Stamford Road, Singapore 178903. Email: christineho@smu.edu.sg.
Sunha Myong, Assistant Professor of Economics, School of Economics, Singapore Management University, 90 Stamford Road, Singapore 178903. Email: sunhamyong@smu.edu.sg.
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***Direct cost of raising children***

Child care needs impose inevitable monetary costs on parents. Child care fees for one child in full-time day care average S$1,223 per month in Singapore (Early Childhood Development Agency, 2019). There is a huge variation in child care fees, which may even exceed S$2,000 per month (Hartung, 2016). Meanwhile, median gross monthly income among Singaporeans and permanent residents who are full-time employees is S$4,232, inclusive of employer contribution to the Central Provident Fund (Ministry of Manpower, 2018). Thus, the median Singapore resident household could be hard-pressed to meet such child care needs. The costs tend to be higher than the level found in comparably developed countries. For instance, the estimated average annual cost of center-based infant child care in the US ranges from US$8,893 for a four-year-old to US$11,313 for an infant. Such costs account for 11% of married couple's median income and 37% of single parents' median income (Child Care Aware of America, 2018).

Since time is the key input in child care, the majority of working women need to employ formal or informal child care (Heckman, 1974). Mothers typically weigh the cost and quality of different forms of child care available when considering whether to work or not. According to Blau and Robins (1988), the employment elasticity with respect to child care cost for married American mothers is estimated at -0.38. This implies that a 10% increase in the price of formal child care would decrease employment of mothers by 3.8%. Estimates in the literature on employment elasticity with respect to the price of child care range from -0.38 to -1.29 (Connelly, 1992; Connelly and Kimmel, 2003).

***Career Cost of Children***

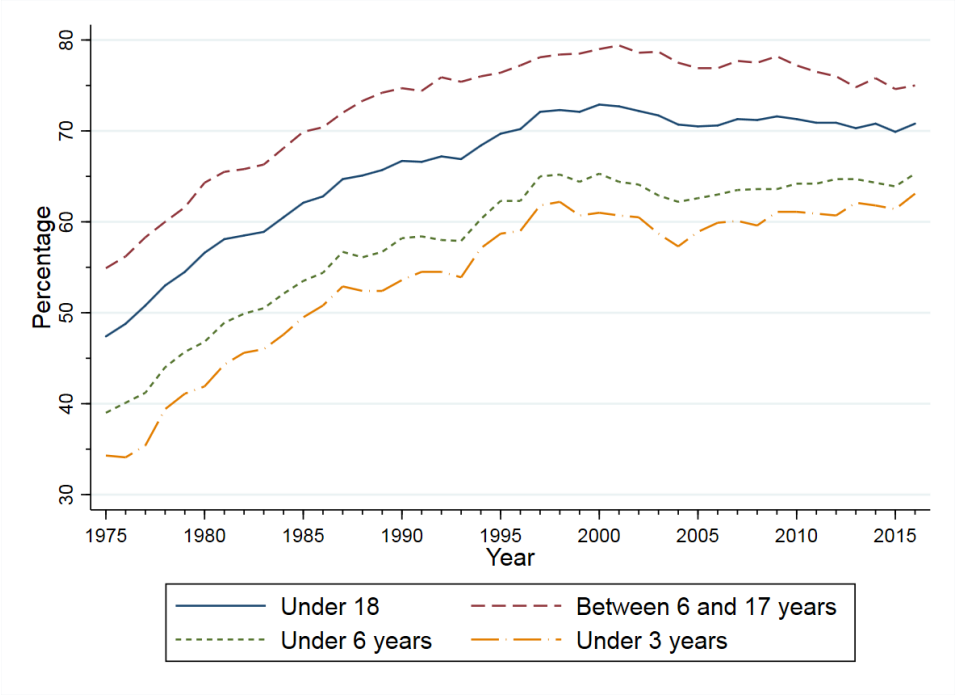
The costs of raising a child goes beyond the direct costs. Mothers tend to face high opportunity costs of child care. Such indirect costs comprise of both short-term costs in terms of the contemporaneous reduction in maternal labour supply and foregone earnings, as well as long-term costs in terms of a slowdown of career achievements and earnings growth.

In terms of short-term costs, married women with children tend to have lower labour force participation (LFP) rates and work fewer hours compared to single childless women (Ortiz-Ospina and Tzvetkova, 2017). Figure 1 illustrates the LFP rates of mothers in the USA from 1975 to 2016. The solid, dashed, dotted and dashed-dotted lines illustrate the LFP rates for mothers whose youngest child is aged below 18, between 6 and 17, under 6, and under 3, respectively. As can be seen from the figure, mothers' LFP rates decrease substantially as the age of the youngest child decreases. The difference in the LFP rates between mothers whose youngest child is aged below 3 and mothers whose youngest child is aged between 6 and 17 was about 20 percentage points until 2010. Although the gap in LFP rates between those two groups decreased substantially from 2010 onwards, the gap is still greater than 10 percentage points. This large gap in LFP rates across mothers with children of different ages suggests a trade-off between childcare and work.

The low LPF rates of mothers with young children imply that households have substantial foregone earnings when children are young. Foregone earnings depend on education as more highly educational mothers tend to have higher earnings capacity. Since the educational attainment of women increased substantially over time, the opportunity cost of mothers' child care has increased in recent years. Figure 2 shows that the proportion of American women with four year college education or higher has increased from 6% in 1960 to 40% in 2018. The corresponding proportion for men increased from 10% in 1960 to 36% in 2018. Thus, the proportion of women with higher education is now higher than men. Nevertheless, women's LFP rates did not increased after 1995 (Figure 1). Thus,

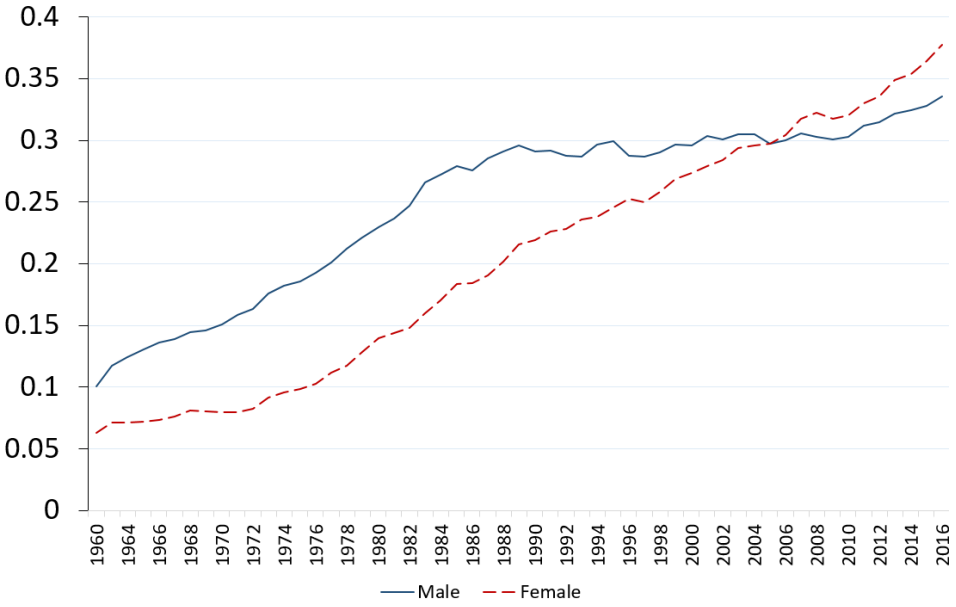
women's higher education and low LFP rates suggest that they face even higher opportunity costs of raising children nowadays.

Figure 1. Labour Force Participation by Age of Children for US Mothers




*Source:* Labour force participation of mothers from Annual Social and Economic Supplements, CPS, U.S. Bureau of Labour Statistics. United States Department of Labour

Figure 2. Proportion of Americans Aged 35-50 with College Education or Higher




*Source:* Historical Time Series, Table A-1, CPS. United States Department of Labour

Career intermittency during the childbearing period also imposes long-term career costs on mothers. Women are more likely to change their careers than men to accommodate their family needs. Higher

female job turnover rates incur substantial career costs by reducing women's opportunity for training and promotion. Indeed, statistical discrimination against women who are perceived as "quitters" account for a substantial part of the gender wage gap (Light and Ureta, 1992; Gayle and Golan, 2011). Although the gap has decreased over time, women still earn less (Blau and Kahn, 1996; Weichselbaumer and Winter-Ebmer, 2005), have slower career development (Catalyst, 2009), and are less likely to make it to leading positions such as executive managers (Gayle and al., 2012) than men. The gender gap in the labour market outcomes exists even at the top end of the ability distribution. For instance, Bertrand and al. (2010) finds that women with MBAs from top US business schools start with similar career paths as men but subsequently face dampened earnings growth due to greater career discontinuity and shorter work hours associated with motherhood. Adjustments in working hours and changing occupation during the childbearing periods reduce women's opportunity to accumulate relevant skills and human capital, which contributes to widening gender wage gap over the life-cycle.

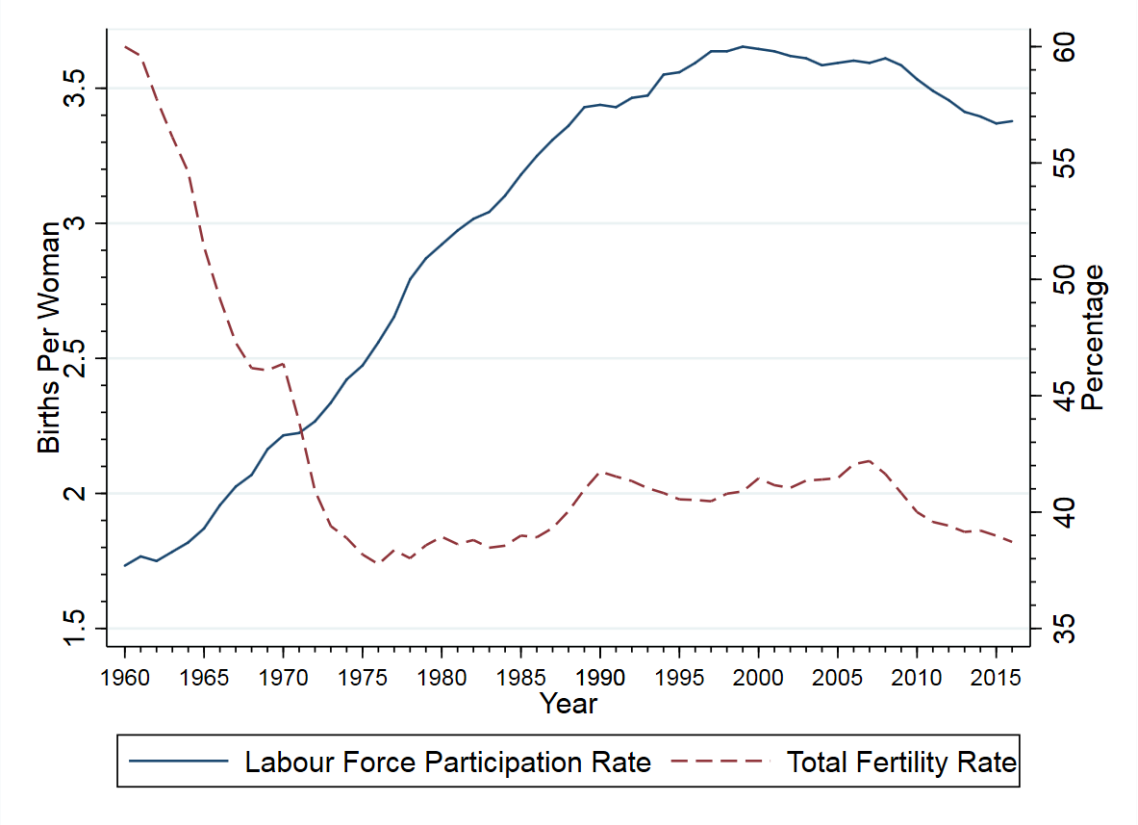
Adda and al. (2017), Gronau (1988), Polachek (1981), and Gronau and Weiss (1981) also highlight that the career cost of children occurs even before a child is born. As women expect frequent career intermittencies, they choose to sort themselves into lower pay and more flexible occupations early on. Accounting for dynamic life-cycle choices over occupation, fertility, and labour supply, Adda and al. (2017) estimate the career cost of children as measured by the percentage loss in net present value of income at age 15. They find that the career cost of children is on average 35.3% of the life-time net present value of female income in Germany. By decomposing the source of the career cost, Adda and al. (2017) find that 27% of career cost is driven by foregone earnings due to intermittency or reduced labour supply, whereas 7.5% of the cost is explained by decreasing wage rate driven by skill depreciation during the career interruption. Overall, the magnitude of career cost of children in a developed country is substantial.

***Fertility Trade-Offs***

Another important trade-off associated with the increasing opportunity cost of raising children is the decline in fertility. Standard economic models predict that an increase in women's wage would increase maternal LFP and decrease fertility (Del Boca, 2002). This is very intuitive as a higher wage implies higher opportunity cost of engaging in child care. Becker (1981) shows that increasing the opportunity cost of childcare is the key driving force explaining decreasing fertility rate along with economic development. Indeed, most developed societies have experienced a fertility decline along with economic growth. Figure 3 illustrates the trends in women's LFP and Total Fertility Rate (TFR) in the United States for years 1960 to 2016. During the period, LFP increased while TFR decreased. The low fertility rates in recent years raise substantial social concerns linked to an aging population. Such low fertility is prevalent across many countries: According to the World Bank, 116 countries out of 247 had their TFR lower than the replacement rate of 2.1 in 2017.

High childcare costs also contribute to delays in motherhood as the family needs more time to save, which also accounts for the decline in TFR as women's fecundity depends on their ages. Using data from the Current Population Survey (CPS), the Pew Research Center compared the percentage of American women aged 40-44 in 1994 (earlier cohort) to the percentage of women aged 40-44 in 2014 (later cohort), who have given birth by a certain age. The findings reveal that 53% of women from the earlier cohort were mothers by the time they were aged 24 as opposed to 39% of women from the later cohort. The median age of women at first birth increased from 23 in 1994 to 26 in 2014 in the USA (Geiger and al., 2019). Similarly, the median age at first birth increased from 28.6 in 2000 to 30.3 in 2016 in Singapore (Strategy Group, 2018; Channel News Asia, 2018).

Figure 3: Labour Force Participation and Total Fertility for US Women




*Source:* Labour force participation of women aged 16 and above from CPS, U.S. Bureau of Labour Statistics, United States Department of Labour; Total fertility rate from World Bank data tables.

***Unequal Division of Child Care***

While most studies on fertility decline in modern societies focus on direct and indirect costs of raising children, unequal gender division in child care could be another important factor that further lowers fertility rates. Despite near universal agreement that both mothers and fathers should share the responsibilities for bringing up children, the burden of care still falls predominantly on women. Data from the American Time Use Survey suggest that women are in fact spending more hours on paid work as well as on child care. Women spent around 25 hours a week on paid work in 2016 compared to 16 hours a week on paid work on 1965; Women also spent around 14 hours a week on children compared to 10 hours a week in 1965 (Geiger and al., 2019). Whereas fathers also invest more time in child care, 8 hours per week in 2016 compared to 2.5 hours per week in 1965, the pressure of being involved in child care is still perceived to fall predominantly on women. According to the Pew Research Centre, 77% of adults say that women face a lot of pressure to be an involved as a parent while only 56% say the same about men.

The pressure to jungle multiple social roles may be particularly stressful in Asian societies. Table 1 shows time spent on housework by a husband and a wife in China, Japan, South Korea, Hong Kong, and Taiwan. The housework consists of unpaid domestic and care work. A wife on average spends more than 20 hours per week in unpaid domestic and care work, whereas a husband spends about 5 hours per week on the same housework. Taking the ratio, the share of housework supported by a wife is 0.75-0.84 in Asian societies. The share is much higher than that of the US and other western developed countries, which is about 0.6.

Table 1: Time Spent on Housework (Husband vs. Wife)

| | China | | Japan | | South Korea | | Hong Kong | | Taiwan | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | 1991 | 2012 | 2001 | 2011 | 2004 | 2014 | 2002 | 2013 | 1995 | 2004 |
| **(a) Wife (hours/week)** | 26.2 | 25.4 | 21.4 | 21.5 | 20.71 | 20.79 | 19.80 | 15.60 | 21.28 | 16.68 |
| **(b) Husband (hours/week)** | 5.30 | 5.00 | 4.51 | 4.20 | 3.90 | 4.69 | 6.60 | 4.80 | 5.38 | 3.73 |
| **(a)/(a+b)** | 0.83 | 0.84 | 0.83 | 0.84 | 0.84 | 0.82 | 0.75 | 0.76 | 0.80 | 0.82 |

*Source:* the UN Sustainable Development Goal Indicator (Japan, South Korea, Hong Kong) China Health and Nutrition Survey 1987-2012 (China), the 2004 Survey of Social Development (Taiwan).

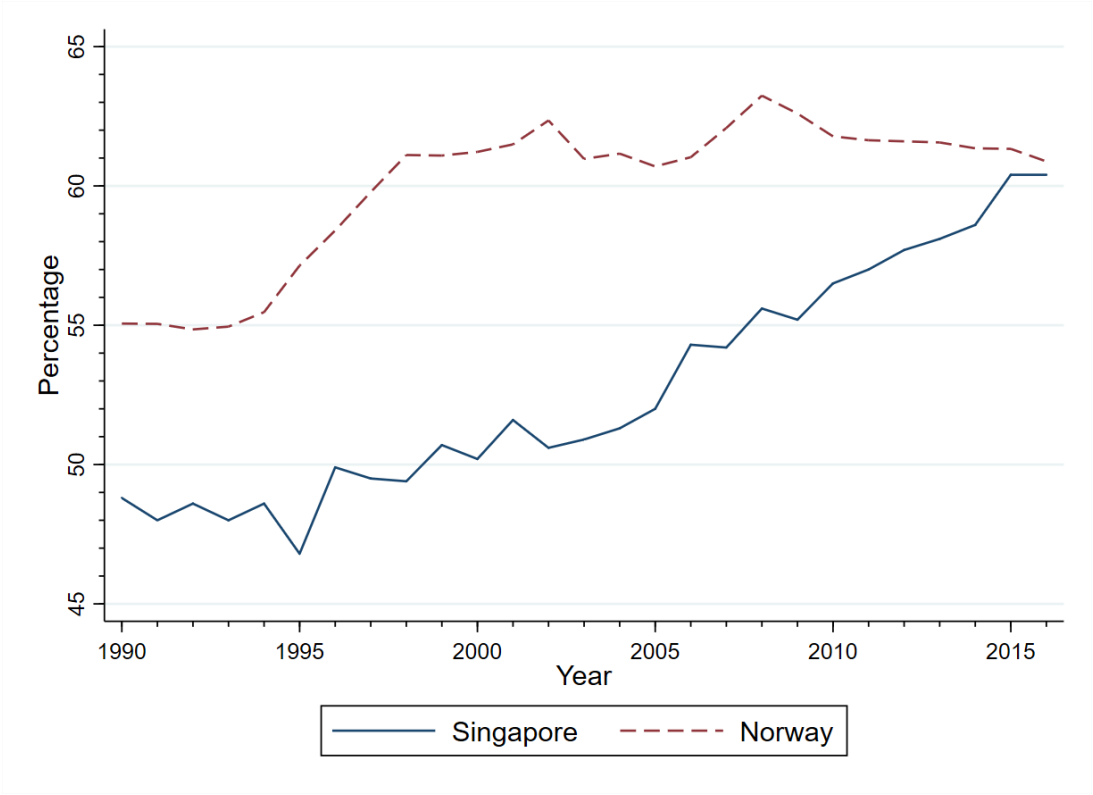
Many believe that women's proper place should be in the family and that women are primarily responsible for household chores and caring of husbands and children (Tang, 2016). Similarly, employed women still shoulder most of the burden of household work. According to data from the 2013 Survey on Social Attitudes of Singaporeans, 51% wives did more of caregiving activities than husbands whereas only 4% of husbands did more of caregiving activities than wives. Data from the 2009 Fatherhood Perception Survey also reveal that mothers spend 20 to 50% more time with children compared to fathers (Ministry of Social and Family Development, 2015). Thus, mothers tend to bear the brunt of the cost of raising children.

Increasing number of studies focus on the implications of unequal gender roles in childcare on fertility rates. Doepke and Kindermann (2019) show that the distribution of child care burden between mothers and fathers is a key determinant of fertility. In particular, women may be less willing to have more children if they expect to bear most of the burden of child care. Given the increasing pressure on women to act as both main caretaker and active breadwinner, women are unsurprisingly delaying motherhood and having fewer children.

Furthermore, Myong and al. (2018) find that Confucian social norms on the intra-household time allocation in childcare play an important role explaining the ultra-low fertility rates in East Asian societies. They document that women do most of the childcare in East Asian societies regardless of their relative wages, which indicates inefficient intrahousehold time allocation in childcare between husbands and wives. In historical East Asian societies when wives' wages were much lower than husbands' wages, the optimal division of labour did not conflict with the social norm. Hence, the social norm would have had negligible effects on fertility in the past. In modern societies, however, the labour division governed by the social norm deviates from the optimal labour division. This is because of the boom in women's education, which increased their relative wages and earnings capacity. The social norm of unequal gender division of childcare, therefore, leads to an unnecessarily high cost of raising children in modern societies.

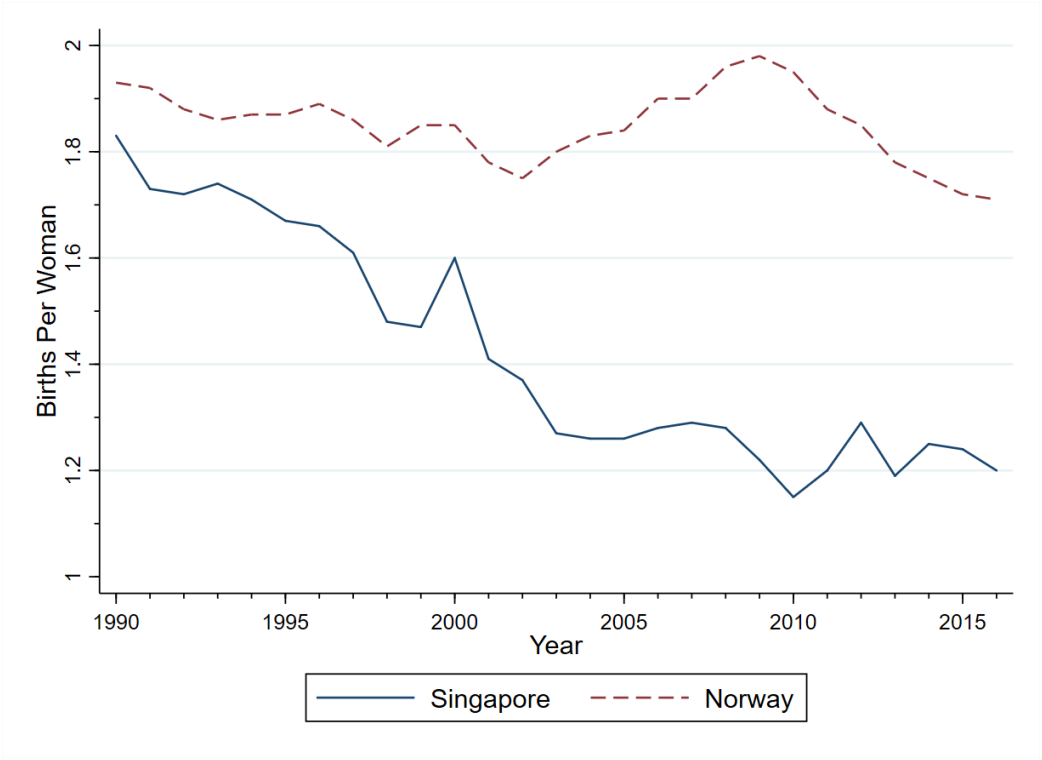
Singapore seems to experience relatively high trade-offs associated with child care compared to some other developed countries. Figures 4 and 5 plot respectively, the female LFP and TFR for Singapore and Norway for years 1990 to 2016. While Singapore's female LFP is converging towards that of Norway, it is still lower to that of Norway. Conversely, Singapore's fertility rate is diverging from that of Norway at a rapid pace, and is now much lower compared to that of Norway. Indeed, Singapore's TFR was the lowest in the world in 2016, ranked 224 among 224 countries (CIA 2016). Motivated by this extremely low fertility rate, various child care been policies have introduced. We discuss such policies in Singapore and in other countries in the next section.

Figure 4: Labour Force Participation for Singapore and Norway Women




*Source:* Labour Force Participation Rates from SingStat and World Bank.

Figure 5: Total Fertility Rate for Singapore and Norway Women




*Source:* Total Fertility Rate from SingStat and World Bank.

### 10.3 Child care support

***Child related support: Baby bonus, parental leave, and child tax reliefs***

**Baby Bonus:** Providing a baby bonus for a new-born is a widely adopted policy across many countries. Many studies find positive effects of such policies on fertility rate. Based on the change in the child benefit in Israel between 1999 and 2005, Cohen and al. (2013) find that a 1% increase in the price of raising a marginal child in the future leads to a 0.496% decrease in the probability of a woman becoming pregnant in a given year. They also found that 1% increase in the child transfer leads to a 0.176% increase in the probability of a women becoming pregnant in a given year. Milligan (2005) evaluates a pro-natalist cash transfer policy in Quebec (paying up to C$8,000 to families with a new-born) and finds that child-related cash transfers help boost fertility. The effect is heterogeneous as households with a larger number of existing children experience larger increases in fertility in response to the cash transfers. A baby bonus increases households' expected income, which in turn increase fertility. Such income effect tend to be greater for households with more existing children.

The government of Singapore financially supports Singaporeans by providing gifts under the baby bonus scheme for new-borns. The amount is S$8,000 for the first and the second baby and S$10,000 for the third to fifth baby. The cash transfers is dispatched over the course of 18 months. The bonus may help finance delivery cost although it covers only a small fraction of total cost of raising a child.

**Parental Leave:** Many countries have a parental leave policy (Olivetti and Petrongolo, 2017). While earlier studies find weak effects of parental leave on women's employment and wages (Klerman and Leibowitz, 1999; Baum, 2003), recent papers find more significant impact of parental leave policy on fertility rates. Lalive and Zweimüller (2009) find that an extension of parental leave for the current [future] child increases fertility within 3 years of the policy change by 5 [7] percentage points. The extension of parental leave significantly reduces employment within 3 years but the effect is mitigated after three years. They also find that the labour market outcomes of white-collar women are more sensitive to the extension of parental leave policy. 14 out of 100 white-collar women do not return to work within three years whereas 4 out of 100 white-collar women do not return to work after three years. Conversely, 9 out of 100 blue-collar women do not return to work within 3 years while there are no effects on the return rate of blue-collar women after three years. This finding suggests that skilled women face a greater trade-off between labour supply and fertility.

Whereas maternity leave is meant to help mothers preserve their job, it may in fact worsen the unequal intra household division of child care between husband and wife. Barigozzi and al. (2018) argue that parental leave policy may have unintentional impacts through social norms. In particular, if parental leave is taken mostly by mothers, it reinforces social norms on gender roles within a household, which in turn, may result in inefficient labour supply and career choices of women. This finding suggests that policy considerations need to account for the joint labour supply and child care decisions of both husbands and wives.

Singapore has a relatively standard paid maternity leave policy. Working mothers, who worked for the employer for continuous periods of at least 3 months immediately before the birth of their child, are eligible for 16 weeks of paid maternity leave. Mothers receive 100% of the usual monthly salary if the child is Singaporean (Ministry of Manpower, 2019b). The share covered by the government varies between 50% for the first and the second child (while the rest is covered by the employer) and 100% for the third and subsequent child.

Table 2: Maternity and Paternity Leave in OECD Countries

| Countries | Total Paid Leave Available to Mothers | | | Total Paid Leave Reserved for Fathers | | |
|---|---|---|---|---|---|---|
| | Length in weeks | Average payment rate (%) | Full-rate equivalent, in weeks | Length in weeks | Average payment rate (%) | Full-rate equivalent, in weeks |
| Australia | 18.0 | 42.9 | 7.7 | 2.0 | 42.9 | 0.9 |
| Austria | 60.0 | 82.3 | 49.4 | 8.7 | 75.8 | 6.6 |
| Belgium | 32.3 | 40.4 | 13.1 | 19.3 | 25.7 | 5.0 |
| Chile | 30.0 | 100.0 | 30.0 | 1.0 | 100.0 | 1.0 |
| Denmark | 50.0 | 53.0 | 26.5 | 2.0 | 53.0 | 1.1 |
| Finland | 161.0 | 25.1 | 40.4 | 9.0 | 62.9 | 5.7 |
| France | 42.0 | 42.9 | 18.0 | 28.0 | 19.2 | 5.4 |
| Germany | 58.0 | 73.4 | 42.6 | 8.7 | 65.0 | 5.7 |
| Ireland | 26.0 | 26.7 | 6.9 | 2.0 | 26.7 | 0.5 |
| Italy | 47.7 | 52.7 | 25.2 | 0.8 | 100.0 | 0.8 |
| Japan | 58.0 | 61.6 | 35.8 | 52.0 | 58.4 | 30.4 |
| Korea | 64.9 | 38.8 | 25.1 | 52.6 | 29.3 | 15.4 |
| Netherland | 16.0 | 100.0 | 16.0 | 0.4 | 100.0 | 0.4 |
| Norway | 34.0 | 100.0 | 34.0 | 15.0 | 100.0 | 15.0 |
| Poland | 52.0 | 80.0 | 41.6 | 2.0 | 100.0 | 2.0 |
| Portugal | 30.1 | 67.7 | 20.4 | 22.3 | 56.3 | 12.5 |
| Spain | 16.0 | 100.0 | 16.0 | 4.3 | 100.0 | 4.3 |
| Sweden | 55.7 | 62.1 | 34.6 | 14.3 | 75.7 | 10.8 |
| United Kingdom | 39.0 | 30.1 | 11.7 | 2.0 | 19.2 | 0.4 |
| United States | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| OECD average | 53.9 | - | - | 8.1 | - | - |

*Source:* OECD Family Database (2018) . Data for Norway is from Norwegian Labour and Welfare Administration (2019).

Table 2 documents parental leave policies in selected OECD countries. The total paid leave entitlement available to mothers is the sum of employment-protected leave of absence for employed women directly around the time of birth and the employment-protected parental and home care leave that can be used by the mother. The total paid leave entitlement reserved for fathers is the sum of employment-protected leave of absence for employed men directly around the time of birth and employment-protected parental or home care leave that can be used *only* by the father. Netherlands and Spain have similar maternity leave policies as in Singapore, whereas most other countries except for the US have longer maternity leave period than Singapore. The benefit rate (i.e., maternity leave benefits as a proportion of the usual monthly salary) tends to decrease with the leave period.

Unlike maternity leave, most countries have shorter leave entitlement for working fathers. The average length of paternity leave reserved for fathers across all OECD countries is 8.1 weeks. If we look at the paternity leave excluding parental and homecare leave reserved for fathers, the average length is 1.4 weeks. Singapore introduced paid paternity leave in 2015 (Ministry of Manpower, 2019c). Under the current system, working fathers (including those self-employed) who worked for continuous periods of at least 3 months immediately before the birth of the child are entitled to 2

weeks of government-paid paternity leave. The government fully finances the benefit, but the benefit is capped at S$2,500 per week, including CPF contributions.

While most countries provide longer and more generous parental leave to mothers than to fathers, some countries provide greater flexibility by allowing married couples to split the leave period as needed. Sweden was the first country to explicitly introduce paternity leave rights in 1974, allowing a mother and a father to share sixteen-month (480 days or 70 weeks) of parental leave. Of 70 weeks of the total parental leave in Sweden, 14.3 weeks are exclusively entitled to fathers (Forsakringskassan, 2019). In Norway, the parental leave has 18 weeks of maternal quota (including 3 weeks of leave before the childbirth), 15 weeks of paternal quota, and 16 weeks of joint period that can be shared by a mother and a father, all at a benefit rate of 100%. The length of leave can be extended to 22 weeks for the maternal quota, 19 weeks for the paternal quota, and 18 weeks of joint period if the couple instead chooses a lower benefit rate of 80% (Norwegian Labour and Welfare Administration, 2019). Such flexibility can allow couples to jointly allocate their time between childcare and working without being constrained by gender specific assignment of parental leave benefit.

The need for mothers to recover from child delivery and breastfeeding may partially rationalize the gender bias in parental leave generosity between mothers and fathers. Nevertheless, policies that do not allow flexible leave arrangements between husbands and wives may limit couples' ability to optimally allocate their time between childcare and work. Unequal gender division in childcare at the time of childbirth may widen the gender gaps in childcare, which may reinforce gender norms on unequal division of childcare over the lifecycle and across generations. Inefficient intrahousehold time allocation in childcare does not only reduce maternal labour income and fertility but may also incur a substantial social cost by underutilizing female talents.

Some recent literature finds positive effects of paternity leave on father's involvement in childcare and housework. Tamm (2019) studies the introduction of a parental leave system in Germany in 2007. The reform introduced a father quota: among 14 months of paid parental leave, 2 months are reserved for fathers only. Thus, if the father does not take the leave, the family loses the two months of parental leave. Tamm (2019) finds that the reform increased fathers' family time by about 1.2 hours per weekday and increased father's childcare time by 1.4-1.6 hours per day over weekends. Moreover, fathers who took parental leave significantly increased their time for errands (e.g., shopping, trip to government agencies, etc.) compared to those who did not, which suggests that paternity leave may not only increase father's childcare involvement but may also promote greater gender equality in housework. Similarly, Patnaik (2019) examines the impact of "daddy quotas" in Quebec's Parental Insurance Program (QPIP), which improved compensation and reserved 5 weeks of leave for fathers. She finds that the quotas and framing of some weeks as "daddy only" substantially increased the proportion of fathers who take up paternity leave. From time-diary data, she further finds that the reform helped induce a more equal division in home and market production within households.

Other studies do not find that paternity leave help reduce gender inequality in child care. Ekberg and al. (2013) find that a one-month exclusive paternity leave in Sweden in 1995 increased the proportion of fathers who take leave but did not change fathers' take up rate for subsequent child care leave to care of sick children. This suggests that a one month paternity leave might not be enough to alter intra-household division of childcare between wife and husband in the longer-term. Olivetti and Petrongolo (2017) document that the take-up rate of paternity leave tend to be quite low except for Sweden and Iceland.

The literature has argued that low take up rates for parental leave may occur due to negative signalling to the employer (Albrecht and al., 1999; Gupta and al., 2008; To, 2018). Men in particular, may be perceived as less productive if there were to take extended paternity leave. Lee and Kim (2010) argue that the diffusion of family friendly policies reduced the worker productivity, which explains the limited adoption of family friendly programs in South Korea. Related, Dahl and al. (2014) find strong peer effects in paternity leave taking behaviours in Norway and argue that information transmission including how employers react to the leave taking may be the main mechanism behind such peer effects.

**Child tax reliefs:** Tax related schemes that are based on the presence of children may also affect LFP and fertility. Such schemes may relate to tax exemptions or credits that are conditional on the number of children present in the household. Tax exemptions generally involve a reduction in taxable income according to the number of dependents. Conversely, child tax credits may be in the form of a wage subsidy that increases with the number of children and that is deductible against the tax amount payable. For example, the Earned Income Tax Credit (EITC) in the United States provides more generous refundable tax credits to families with more children. The scheme is known for having a trapezoid shape over income: Lower income earners receive a tax credit that is similar in spirit to a wage subsidy, medium income earners receive a flat amount of credit that is similar to receiving additional income as a lump sum benefit, higher income earners face a reduction in tax credit that is similar in spirit to a wage tax. Theoretically, one may therefore expect the EITC to motivate LFP among lower income earners but decrease labour hours among moderate to high income mothers. Meanwhile, low income earners may decrease fertility as the opportunity cost of time is higher while medium and high income earners may increase fertility thanks to, respectively, the higher income and lower opportunity cost of time. Conversely, as the EITC is more generous towards families with more children, there may be an overall incentive to increase fertility. The actual effects of such tax credits is an empirical question.

The literature has generally found that financial incentives may increase fertility. Using data from the Panel Study of Income Dynamics, Whittington (1992) finds that a 1% increase in the value of tax exemptions in the United States increases the probability of an additional birth by 0.23 to 1.31%. Similarly, using data from CPS, Duchovny (2001) finds that an expansion of the EITC which provided incremental benefits to families with two or more children, increased fertility rate by up to 15%. Conversely, using data from birth certificates, Baughman and Dickert-Colin (2007) find that the EITC may have slightly reduced fertility among low educated women. They nevertheless also find that state child tax credits are associated with higher birth rates in the United States.

There is also substantial evidence that financial incentives in the form of tax credits may increase LFP of single mothers although they may also decrease the labour supply of married mothers (Eissa and Hoynes, 2004; Eissa and Leibman, 1996; Meyer and Rosenbaum, 2000). Single mothers are likely lower income as there may be only one income earner in the household while married mothers are likely higher income as there may be dual income earners in the households. The empirical findings, therefore, align with the theoretical predictions described above. Leibowitz and al. (1992) also find that tax credits incentivize mothers to return to work earlier.

Singapore also has several tax related schemes that are based on the presence of children. Parents may claim Qualifying Child Relief (QCR) of S$4,000 per Singaporean child aged below 16 or studying full-time. Working mothers are also eligible for the Working Mother's Child Relief (WMCR) of 15% of mother's earned income for the first child and 20% of mother's earned income for the second child, and of 25% of mother's earned income for the third and subsequent children. The QCR and WMCR

may be offset against taxable income on an annual basis as long as the child is eligible, up to a cap of S$50,000 per child and up to a total personal income tax relief cap of S$80,000 (Inland Revenue of Singapore, 2019a,b). Furthermore, under the Parenthood Tax Rebate (PTR) parents can get tax rebates of up to S$5,000 for the first child, S$10,000 for the second child, and tax rebates of S$20,000 for each subsequent child. The tax rebates may be offset against tax amount payable rolled out to subsequent tax years until the rebate has been fully utilized (Inland Revenue of Singapore, 2019c).

Theoretically, the QCR and PTR are similar to "cash transfers" that are conditional on the number of children. Since those increase a family's disposable income, one may expect such schemes to help incentivise fertility but decrease labour hours. Similarly, the WMCR may increase fertility as the reliefs are more generous with respect to the number of children. Conversely, the WMCR may be perceived as a wage subsidy, which increases the opportunity cost of time of mothers. This, in turn, may boost LFP of mothers but decrease fertility. As can be seen from Figure 4, LFP of mothers in Singapore is catching up to that of Norway. On the other hand, fertility rate in Singapore is diverging from that of Norway, with Singapore's fertility rate being much lower, as can be seen from Figure 5. Future research may need to explore the adequacy of child related policies such as baby bonus, parental leave, and child tax relief schemes that may help boost fertility in Singapore without sacrificing women's careers.

***Formal care support: Child care subsidies and quality***

**Child care subsidies:** Child care subsidies may also help promote fertility and LFP of women as they help decrease the child care burden. Mork and al. (2013) find that anticipation of a reduction in childcare costs increased the number of first and higher order births significantly in Sweden. Policy simulations based on data from 19 European countries also suggest that child care policies that specifically target mothers may be up to three times as effective in incentivizing fertility as child related support that target the household (Doepke and Kindermann, 2019). This is because women face a higher burden of care so they tend to be more opposed to having a child, have lower fertility preferences, and have a greater say in the fertility decision than men. Thus, policies that lower the child care burden on mothers may be more effective in incentivizing fertility compared to policies that provide cash payments to households.

The availability of affordable child care is also a key determinant of maternal labour supply (Heckman, 1974). Several studies find that formal child care subsidies were associated with higher maternal employment (Bainbridge, Meyers, & Waldfogel, 2003; Berger & Black, 1992; Cascio, 2009; Gelbach, 2002; Meyers, Heintze, & Wolf 2002) and formal child care use (Magnuson, Meyers, Ruhm, & Waldfogel, 2007). Using data from the National Survey of American Families, Blau and Tekin (2007) estimated that child care subsidies accounted for 38% of the rise in employment of single mothers. Tekin (2005) finds that child care subsidies was related to higher employment and a substitution from parental and relative care to centre based care whereas Ertas and Shields (2012) find that child care subsidies was related to higher use of centre based care especially for low income families. Intuitively, subsidies on formal child care costs help decrease the cost of child care, which incentivize mothers to work.

More than 99% of children attend at least one year of preschool in Singapore (Early Childhood Development Agency, 2017). Singaporean children enrolled in Early Childhood Development Agency (ECDA) licensed child care centers benefit from a basic subsidy per child. Under the basic subsidy, working mothers with infants aged from 2 to 18 months receive up to S$600 a month while children aged from 18 months to below 7 years receive up to S$300 a month. Non-working mothers

receive S$150 a month for infants and children. The subsidies are pro-rated according to the number of hours that the child spends in day care.

Singaporean children with a mother who works for 56 or more hours a month also benefit from additional subsidies. The additional subsidy is means-tested and follows a sliding scale, that is, the additional subsidy rate as a percentage of net child care fees (child care fees minus the basic subsidy) declines with household income. For instance, the additional subsidy covers up to 99% of net child care fees for households with monthly income below S$2,500 but only up to 50% of net child care fees for households with monthly income of between S$4,501 to S$7,500. Eligibility may also be determined according to per capita income when there are 5 or more family members including at least more than 2 dependents in the household.

Table 3 summarizes the child care subsidies structure for full-time day care in Singapore. Three key features of the additional child care subsidy are worth noting here:

1. There is a work requirement.
2. The subsidy rates follow a sliding scale.
3. There is a cap on the maximum subsidy receivable.

Table 3: Monthly Child Care Subsidies per Child in Singapore

| Household Income S$ | Per Capita Income S$ | Basic Subsidy S$ | Minimum Co-payment S$ | Max Add Subsidy S$ | Max Add Sub as a % of net fees |
|---|---|---|---|---|---|
| A. Full Day Child Care Programme | | | | | |
| 2,500 and below | 625 and below | | 3 | 440 | 99% |
| 2,501 – 3,000 | 626 – 750 | | 6 | 400 | 98% |
| 3,001 – 3,500 | 751 – 875 | | 32 | 370 | 90% |
| 3,501 – 4,000 | 876 – 1,000 | 300 | 63 | 310 | 80% |
| 4,001 – 4,500 | 1,001 – 1,125 | | 95 | 220 | 70% |
| 4,501 – 7,500 | 1,126 – 1,875 | | 215 | 100 | 50% |
| Above 7,500 | Above 1,875 | | N.A. | N.A. | N.A. |
| B. Full Day Infant Care Programme | | | | | |
| 2,500 and below | 625 and below | | 60 | 540 | 99% |
| 2,501 – 3,000 | 626 – 750 | | 100 | 500 | 98% |
| 3,001 – 3,500 | 751 – 875 | | 130 | 470 | 90% |
| 3,501 – 4,000 | 876 – 1,000 | 600 | 190 | 410 | 80% |
| 4,001 – 4,500 | 1,001 – 1,125 | | 280 | 320 | 70% |
| 4,501 – 7,500 | 1,126 – 1,875 | | 400 | 200 | 50% |
| Above 7,500 | Above 1,875 | | N.A. | N.A. | N.A. |

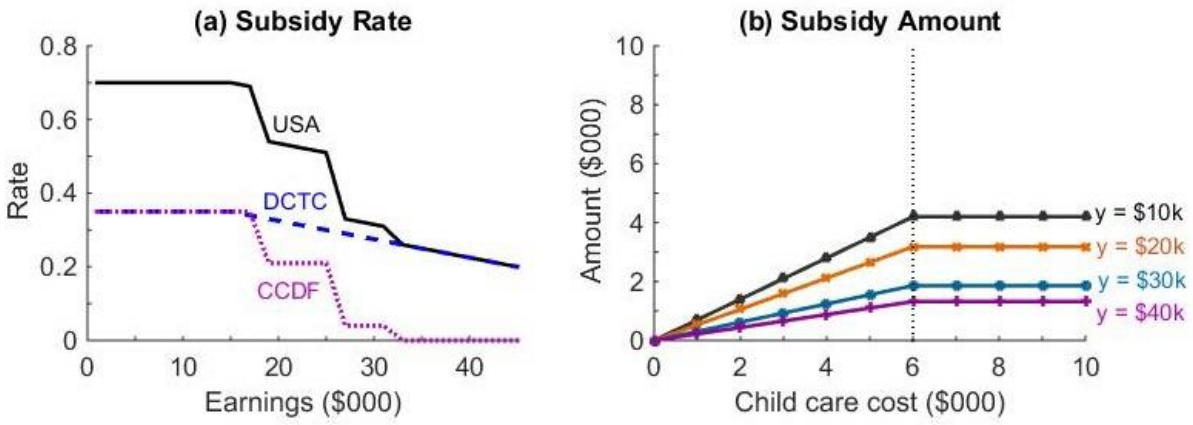
*Source:* Early Childhood Development Agency (2017).

Child care subsidies on the cost of formal child care in the USA also incorporate similar features. In the USA, the Dependent Care Tax Credit (DCTC) is a non-refundable federal income tax credit program available to families with children aged under 13 and covers part of child care expenses. It is available only to families who earn income and pay taxes. The DCTC has a tax credit rate of 35% of child care expenses for families with annual gross income of less than $15,000. The tax credit rate declines by 1% for each $2,000 of additional income until it reaches a constant tax credit rate of 20% for families with annual gross income above $43,000. The DCTC has a cap on child care expenditure of $3,000 for families with one child and $6,000 for families with two children.

Low income American families who are engaged in work related activities may also benefit from child care subsidies under the Child Care and Development Fund (CCDF). Whereas the federal recommended subsidy rate for the CCDF is 90%, only a certain proportion of eligible households receive the subsidy: 39%, 24%, and 5% of households living, respectively, below, between 101% and 150%, and above 150% of the poverty threshold (US Department of Health and Human Services, 2009). Similarly, the CCDF imposes a cap on the maximum subsidy amount, which varies across states. Figure 6 illustrates the subsidy rate and the maximum subsidy amount under the US child care subsidy programs.

Even though there is a vast literature on the impact of child care subsidies on employment of mothers and considerable policy debates on affordability of child care, few studies have looked at the optimal design of child care subsidies. Ho and Pavoni (2020) study the design of such subsidies within an optimal welfare framework, where heterogeneous mothers have private information on labour market productivities. Mothers have child care needs and allocate effort between the primary labour market and household child care activities. In their framework, they show that it is optimal to subsidize formal child care for low income working mothers. Child care subsidies help parents face a lower (subsidized) price of formal child care. As mothers find it cheaper, they use more of formal child care, which frees up their time for work.

Figure 6: US Tax and Subsidy Schedules




*Source:* Ho and Pavoni (2020). Panel (a) reports child care subsidy rates under DCTC and CCDF, and the consolidated rates (solid line) as a function of gross family income. Panel (b) reports the amounts of child care subsidies received as a function of total formal child care costs and by family income (y) for a family with two children aged below 13.

Ho and Pavoni (2020) further show that it is optimal to have sliding scale child care subsidy rates. In particular, for a given market productivity, the higher the labour income, the lower the time available for household child care and the higher is formal child care use such that there is a lesser need to subsidize formal child care. Hence, the optimal child care subsidy rate decreases with income. Finally, since low and high skilled individuals face different marginal returns from household child care, the optimal child care subsidy schedule is kinked such that the child care subsidy rates are positive up to a cap on formal child care costs. Interestingly, such qualitative features are very much in line with the key qualitative features of child care subsidy programs in the United States and in Singapore.

Norway has very interesting features in their relatively generous child care subsidies program. The maximum child care fee payable by parents are decreasing in the birth order of children. In particular, kindergarten fees for the first child cannot exceed 6% of family income whereas the second and third

or higher order children, respectively, face 70% and 50% of the fees set for the first child. Furthermore, a scheme to provide 20 hours of free kindergarten a week was introduced in 2015 (Ministry of Education and Research, 2016). Given Norway's relatively high female LFP of 67.6% in 2016 and TFR of 1.71 (Statistics Norway, 2019a,b), future research may explore the incentives embedded within a universal kindergarten scheme with generous child care subsidies that increase in birth order of children. Indeed, Doepke and Kindermann (2019) argue that child care subsidies for the first child would not boost fertility while subsidies for the second and third birth orders would be effective in boosting fertility for couples. The intuition is that very few couples have no children so that the marginal choice lies in whether to get a second or third child.

**Quality:** Cultural shifts in perceptions about motherhood may also have contributed to Norway's success in incentivizing female employment while experiencing slower trends in fertility decline. The majority of younger cohorts now consider maternal employment the norm and disagree with the statement that "it is best that women are not working when they have pre-school children" or that "pre-school children suffer if their mother works" (Ellingsæter and Gulbrandsen, 2007). Parents may also perceive formal child care as a means to improve child outcomes, such that there is a greater shift in the usage of such care. 79% of children aged 1-2 and 96% of children aged 3-5 attended formal day care (Statistics Norway, 2011). The literature has found that good formal child care may benefit children, especially those from poor socioeconomic backgrounds (Blau and Currie, 2006; Cascio and Schanzenbach, 2013; Havnes and Mogstad, 2015). For instance, Cornelissen and al. (2017) find that children from disadvantaged background were more likely to have higher gains in terms of school readiness and health outcomes when enrolled in formal child care.

Thus, the provision of good quality formal child care may help reduce the stigma associated with working mothers leaving children in day care. Under the Singapore's Child Care Centres Act, "any premises at which 5 or more children who are under the age of 7 years are habitually received for the purposes of care and supervision during part of the day or for longer periods" need to be licensed by ECDA. Minimum staff-child ratios as well as minimum training requirements are imposed on staff so as to ensure adequate standards of care. Table 4 summarizes the minimum staff-child ratios as per licensing requirements. For instance, minimum educator/teacher-child ratios of 1 to 5 are imposed for infants aged 18 months and below and 1 to 8 on children aged 18-30 months. The number of children may increase by 50% in the presence of a para-personnel who assists the main educator/teacher.

Table 4 Minimum Staff-Child Ratios in Licensed ECDA Child Care Centres

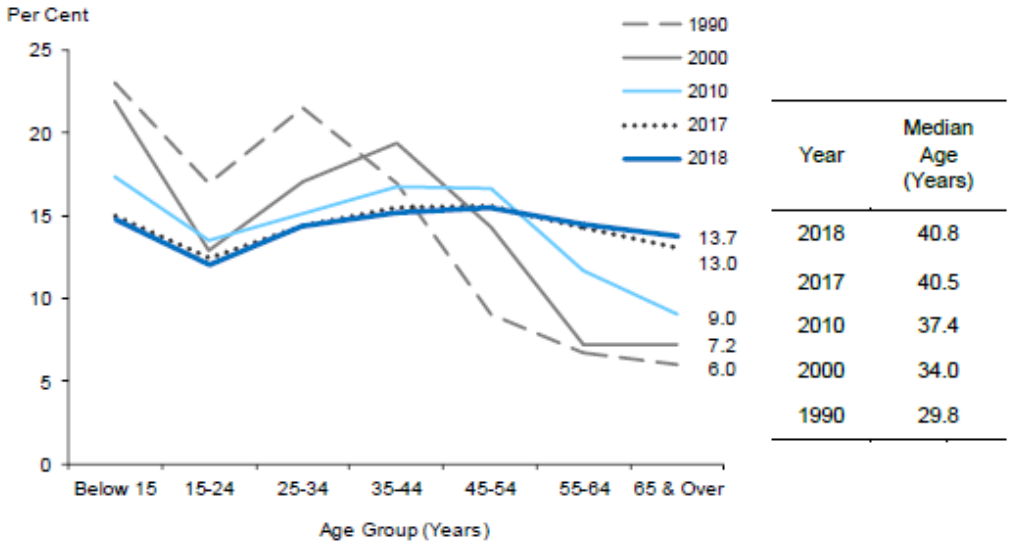
| Age of Children (Group/class type) | Staff to Children Ratio | |
|---|---|---|
| | No Para-Personnel | With Para-Personnel |
| 18 months and below (Infant) | 1:5 | Not Applicable |
| Above 18-30 months (Playgroup) | 1:8 | 1+1:12 |
| Children attaining 3 years of age in the calendar year when the class commences (Nursery 1) | 1:12 | 1+1:18 |
| Children attaining 4 years of age in the calendar year when the class commences (Nursery 2) | 1:15 | 1+1:20 |
| Children attaining 5 years of age in the calendar year when the class commences (Kindergarten 1) | 1:20 | 1+1:25 |
| Children attaining 6 years of age in the calendar year when the class commences (Kindergarten 2) | 1:25 | 1+1:30 |

*Source:* Early Childhood Development Agency (2017)

***Informal care support: Grandparents and domestic helpers***

**Grandparents:** Increasing life expectancy coupled with declining fertility rates have contributed towards the verticalization of families over the past few decades. According to the United Nations, while 12.6% of the population in Asia and Pacific was 60 years or older in 2016, more than 25% are projected to be 60 years or older by 2050 (United Nations ESCAP, 2016). Similarly, as can be seen from Figure 7, the median age of the resident population in Singapore has been increasing steadily over the past few decades, from 29.8 in 1990 to 40.8 in 2018. The proportion of Singapore's resident population aged 65 years and over also increased from 6% in 1990 to 13.7% in 2018 (Department of Statistics Singapore, 2018). Such increase in the number of generations simultaneously alive creates further opportunities for intergenerational support which may take the form of monetary and time transfers (Bengtson, 2001; Ho, 2015a; McGarry and Schoeni, 1995; Soldo and Hill, 1995).

Figure 7: Age distribution of resident population in Singapore




| Year | Median Age (Years) |
|---|---|
| 2018 | 40.8 |
| 2017 | 40.5 |
| 2010 | 37.4 |
| 2000 | 34.0 |
| 1990 | 29.8 |

*Source:* Chart 1.1 in Department of Statistics Singapore (2018)

The context of grandparents as a source of help to younger generations is gaining increasing attention in the family studies and productive aging literature. Indeed, data from the CPS indicates that the proportion of American children under 18 living with a grandparent has more than doubled from 3.2% in 1970 to 10% in 2012 (Ellis and Simmons, 2014). There is also a considerable proportion of children benefiting from grandparent provided child care even if the grandparent does not necessarily live in the same house. Survey of Income and Program Participation data shows that the proportion of such children who benefit from grandparent provided child care increased from 15% in 1988 to 23.4% in 2011. Data from the Health and Retirement Study (HRS) further reveal that grandmothers spent on average 816.5 annual hours while grandfathers spent on average 346.9 annual hours on grandchild care, among those who provided at least one hour of child care per year (Rupert and Zanella, 2018).

Grandparents' involvement in grandchild is also common in many other countries. Data from the Survey of Health, Ageing and Retirement (SHARE) in Europe indicates that more than 50% of grandparents provide care for grandchildren in Demark, France, Hungary, Sweden, the Netherlands, United Kingdom, and Romania (Glaser and al., 2013). About 32% of European grandmothers are engaged in childcare on a regular basis (Frank and Buber, 2009). Similarly, data from the China Health and Retirement Longitudinal Study suggests that about 58% of Chinese respondents provided

grandchild care in 2008 (Ko and Hank, 2014). Data from the Korea Longitudinal Study of Ageing suggests that 13% of Korean grandparents with grandchildren aged less than 10 provided grandchild care in 2006, whereas data from the Korean National Child Care Survey suggests that about 35% of parents with children aged below 6 received child care help from older parents in 2012 (Kim and al., 2018). Lee and Bauer (2010) further document that Korean grandparents providing care for their grandchildren devote an average of 51.7 hours per week to care for grandchildren.

Grandparent provided child care is also an important form of support in Singapore. A 2005 survey from Singapore children's society has shown that 40% of children aged below 3 are cared for by their grandparents (Thang and al., 2011). Data from the National Survey of Senior Citizens (NSSC) further suggests that about 49% of Singaporeans aged 55 and above have grandchildren and that 28.6% of grandparents help their adult children look after the grandchildren in 2011. In particular, 35.2%, 30.8%, and 13.5% of those aged, respectively, 55 to 64, 65 to 74, and 75 and above provide grandchild care. 33.6% of grandmothers and 20.9% of grandfathers looked after grandchildren (Ministry of Social and Family Development, 2011).

We present some more recent descriptive statistics on grandchild care from the Singapore Life Panel (SLP) below. The SLP is a nationally representative longitudinal survey of around 10,000 Singaporeans (and their spouses) who were aged between 50 and 70 in July 2015. The respondents are, therefore, on average younger than those in the NSSC. A special family module was run in June 2019 to survey SLP respondents on some basic demographic characteristics of each their living children as well as on time and money transfers given to and received from each living child.

We focus on the sample of SLP respondents with adult children for our analysis. 45.6% of respondents had grandchildren in the sample. Grandparents had on average 2.7 grandchildren while 84.3% provided some grandchild care over the previous year. Summing across grandchild care help provided to all adult children, 35.3% of grandparents provided between 1 and 20 child-hours of grandchild care in a typical week while 49.0% of grandparents provided 20 or more child-hours of grandchild care in a typical week.

Among grandparent caregivers, 56.8% were female while 43.2% were male, 61% reported to be in good, very good or excellent health while 39% reported to be in poor or fair health, 83.5% were married while 16.5% were single (never married, separated, divorced or widowed), 42.6% were aged less than 65 while 57.4% were aged 65 and above, 32.5% had primary education or less, 42.4% had secondary education, while 25.1% had post-secondary or tertiary education, and 85.0% were Chinese, 7.9% were Malay, 5.2% Indian while 1.9% were of other ethnicity.

Figure 8 illustrates the weekly number of grandchild care hours from grandparent caregivers according to respondents' gender (male / female), health status (poor / good), marital status (single / married), age (less than 65 / 65 and above), education (primary or less / secondary / tertiary), and race (Chinese / Malay / Indian / other). As can be seen from the figure, grandmothers provided on average 31.9 hours of grandchild care while grandfather provided on average 29.6 hours of grandchild care. Younger, healthier, and less educated grandparents tend to provide greater grandchild care while there are no differences across marital status. Those of other ethnicity provided the most grandchild care hours, followed by those of Malay, Indian and Chinese ethnicity, respectively.

We also document grandchild care according to the characteristics of SLP respondents' adult children, that is, the parents of the grandchildren. To do so, we reshape the sample at the adult child level, such that we have one observation per adult child. 32.9% of adult children had kids in the sample. Parents

had on average 1.8 kids while 60.5% benefited from grandparent provided child care over the previous year. 39.5% of children received between 1 and 20 hours of grandparent provided child care in a typical week while 21.1% of children benefitted from 20 or more hours of grandparent provided child care in a typical week.

Figure 8 Weekly hours of grandchild care by respondent characteristics


*Source*: June 2019 Singapore Life Panel.

Among adult children who benefited from grandparent provided child care, 52.6% were female while 47.4% were male, 92.3% reported to be in good, very good or excellent health while 7.7% reported to be in poor or fair health, 71.1% provided monetary and in-kind transfers to the respondents over the previous year while 28.9% did not, 67.3% were expected to provide moderate to a lot of future instrumental help to respondents should the need arise while 32.7% were expected to provide little or no future help, 20.5% coresided with the respondent, 22.2% lived within 2km, 14.6% lived within 2 to 4 km, 36.7% lived within more than 4km, while 6% were abroad, 51.4% were first born, 33.7% were second born, 12.2% were third born, 2% were fourth born, while 0.7% were fifth born.

Figure 9 illustrates the number of grandchild care hours received from grandparent caregivers according to adult children's gender (male / female), health status (poor / good), monetary and in-kind transfers from children to parents (no transfers / transfers), expectations that the child will provide future instrumental help to the parent should the need arises (no expectations / expectations), living arrangements (coresident / <2km / 2-4km / >4km / abroad), birth order (first / second / third / fourth / fifth). As can be seen from the figure, children who were female and in poor health benefited from higher grandparent provided child care than their counterparts.

Children who provided respondents with monetary and in-kind transfers as well as children who are expected to provide future instrumental help also seem to benefit from higher hours of child care from the grandparents. These may be driven by living proximity as children who live close to the respondents are more likely to provide monetary and in-kind transfers and are also expected to provide higher instrumental help. Unsurprisingly, locally based children who coreside or live closer to the grandparents benefit from greater hours of grandchild care. Meanwhile grandparents also seem to provide substantial amount of grandchild care when the parents of the grandchildren reside abroad. Younger children also benefit from greater hours of grandchild care, which aligns with the fact that those children may have younger kids who typically have higher child care needs.

Figure 9 Weekly hours of grandchild care by adult child characteristics


*Source:* June 2019 Singapore Life Panel.

Child care needs seem to be an important factor driving grandparents' involvement in grandchild care. Lei (2008) documents that American grandmothers are likely to help their low income children by working more to provide financial help or by providing grandchild care. Ho (2015a) also finds that American grandparents with a new born grandchild are more likely to provide grandchild care. Coresident grandparents and those living within 10 miles of grandchildren are also more likely to provide grandchild care while married grandparents are more likely to provide financial support to their adult children.

There is general consensus in the literature that the availability of grandparent provided child care help promote the labour force participation of young mothers (Leibowitz and al., 1992; Sasaki, 2002; Maurer-Fazio and al., 2011; Posadas and Vidal-Fernández, 2012). Compton and Pollak (2013) show that close geographical proximity to grandmothers has a substantial positive effect on the labour

supply of married American mothers. Dimova and Wolff (2011) find that regular grandchild care increase labour force participation of mothers in Europe. Compton (2013) also finds that living proximity to a grandparent is positively related to maternal labour supply in Canada. More recently, Bratti and al. (2018) find that Italian parents whose mothers are retirement eligible are more likely to be in the labour force, suggesting that the availability of child care help from retired grandmothers may encourage mothers to work.

Grandparent provided child care may also help boost fertility. Del Boca (2002) finds that the availability of grandparent support increases both the younger generation's fertility and maternal labour supply in Italy. Aassve and al. (2012) finds that grandparents' help increases the chance of childbearing when existing grandchildren are not too young in European countries. Grandparents play a greater role in boosting fertility in the South of Europe where publicly available childcare is less prevalent. Hank and Kreyenfeld (2003) documents that the availability of informal care significantly increases the probability of having the first child. If parents live in the same town, the probability of having the first birth significantly increases.

Singapore's government recognizes and supports the role of grandparents as caregivers for grandchildren because they are important in helping promote birth rates. The grandparent caregiver tax relief was introduced as part of a new procreation package in 2004. The scheme enables working Singaporean mothers, whose children aged below 12 are being cared for by unemployed grandparents, to receive income tax relief of S$3,000 per year (Thang and al., 2011). Similarly, informal child care such as care provided by grandparents may be subsidized under the Child Care and Development Fund in the United States (Truskinovsky, 2016).

Nevertheless, whereas grandparents may be an important source of help to parents, such grandparents may also face repercussions on their own. Rupert and Zanella (2018) find that becoming a grandparent decreases grandmothers' labour hours by 30%. Truskinovsky (2016) finds that informal child care subsidies may reduce American grandmothers' formal labour supply and earnings and increase their reliance on alternative social programs. There are also concerns about potential negative associations between extensive grandchild care and grandparents' health in the sociological and medical literature (Baker and Silverstein, 2008; Fuller-Thomson and Minkler, 2000; Hughes and al., 2007; Minkler and Fuller-Thomson, 2001).

Ho (2015b) studies the indirect effects of the 1996 Personal Responsibility and Work Opportunity Reconciliation Act in the United States on grandmothers' economic behavior, which aimed at getting low income mothers off welfare and into work. Using data from the HRS, she finds that the reform decreased time transfers but increased money transfers from grandmothers. In particular, the loss of welfare benefits by low income young mothers together with higher formal child care subsidies seem to have encouraged families to substitute away from grandmother care to formal child care while at the same time encouraged money transfers from grandmothers to either compensate for the loss in welfare benefits, or pay for the extra formal child care cost not covered by the formal child care subsidies. Coresident grandmothers also increased their labour supply, suggesting that they may have been shouldering part of the loss in welfare benefits.

Cardia and Ng (2003) also argue for the subsidization of grandparent provided child care when the grandparent is retired so that the younger generation can devote more time to the labour market. Ho (2019) argues for subsidization of formal child care so that the elderly may devote more time to the labour market. Whether to subsidize grandparent child care or formal child care or both remains an under researched question that would depend on which generation should work longer accounting for

child care quality and fertility considerations. Given longer life expectancies and increasing female labour participation, future research on the suitability of grandparent provided child care as both a source of child care for working mothers and a form of postretirement labour for grandparents may be relevant for future policy.

Understanding how child care needs affect socio-economic behaviour across generations is important since policies targeting the younger generation's work and child care decisions can have potential unpredicted repercussions on the older generation (Rozenweig and Wolpin, 1994; Schoeni, 2002). At an age where one could be anticipating the enjoyment of their later years, one could be called forth to help with grandchildren which would be resource intensive for the grandparent. With the increasing involvement of grandparents in the lives of their grandchildren, it becomes increasingly important for policy to provide complementary help to parents and grandparents.

**Domestic helpers:** In the context of Singapore, foreign domestic helpers may constitute a complementary form of informal child care. The government in Singapore recognizes that skilled women may not be in gainful employment as they are burdened by household duties. The Foreign Domestic Servant Scheme was, therefore, introduced in 1978 to facilitate female employment (Ministry of Culture, 1978). Levy concessions of S$60 per month are available to foreign domestic worker employers who need care for their coresident Singaporean children aged below 16 (Ministry of Manpower, 2019a). As grandchild care may be a strenuous activity, Singaporean grandparents may also request that their adult children employ full-time domestic helpers (Teo and al., 2006). A survey conducted by the Singapore Children's Society indicate that 30% of children aged below 12 are cared for by domestic maids, usually from Philippines and Indonesia (Thang and al., 2011).

### 10.4 Discussion

This chapter discussed how child care costs may affect fertility and maternal labour supply. The cost of children may be direct and indirect. Direct costs include the direct cost of providing child care while indirect costs include opportunity costs in terms of maternal contemporaneous employment and earnings losses as well as in terms of their skills depreciation and foregone career paths. As women struggle to jungle between the pressures of motherhood and of the labour market, fertility rates took a plunge. Such trends are exacerbated by persistent social norms in unequal division of household child care. This is particular pertinent in many Asian societies.

Governments have stepped up their efforts to support women in their careers and in raising children. Child related support such as baby bonus, parental leave, and child tax reliefs are relatively common worldwide. There is general agreement that such help from the government may help boost fertility and maternal employment. We do note, however, that there is scope for improving parental leave policies. In particular, parental leave tends to be much more generous towards mothers than fathers, which may reinforce traditional gender roles that perpetuate over the lifecycle and across generations. The introduction of greater flexibility between maternity and paternity leave substitution may help improve intra-household time allocation between husbands and wives. Such flexibility in parental leave may need to be complemented by proper incentives for firms to better accommodate workers' child care needs and minimize the stigma associated with parental leave so as to ensure higher child care leave take up rates, irrespective of gender.

Formal child care support such as child care subsidies and quality are also very common worldwide, although there are many differences across countries. Child care subsidies in the United States and in Singapore have similar qualitative characteristics that have been found to incentivise work: The

subsidies are paid to or are more generous towards employed mothers, the subsidy rates as a proportion of price of formal child care are sliding scale such that they decline with income, and there is a cap on the maximum subsidy amount receivable. Tying more generous child care subsidies to higher birth orders may also help boost fertility at the intensive margin. Such subsidies help reduce the price of formal child care and, therefore, may help boost both fertility and maternal employment, especially when complemented with good quality formal child care.

Finally, the availability of informal child care support such as grandparents and domestic helpers may also help boost fertility and maternal employment. Singapore is unique due to its size and location. Thus, it is easy for grandparents to travel on a daily basis to look after grandchildren. Similarly, it is relatively easy for foreign domestic helpers to travel from surrounding regions to Singapore. Nevertheless, it is important for policy makers to account for the potential consequences of intensive grandparenting on the employment and health of grandparents. Grandparents and domestic helpers may be complementary forms of informal child care rather than substitutes.

Whereas this chapter has focussed on the costs of children, fertility and maternal employment, it is important to recognize that the issues at work may go beyond the costs of children. In particular, low fertility rates could also be driven by reduced gains from marriage as well as persisting social stigma attached to single moms. There is notably a rise in the proportion of singles in Singapore: Between 1990 and 2016, the proportion of single women aged 25 to 29, 30 to 34, and 35 to 39 increased, respectively, from 39.3% to 64%, from 20.9% to 26.5%, and from 14.8% to 17.5% (Department of Statistics Singapore, 2018). As singlehood tends to be associated with childlessness, the decline in marriage rates has also been blamed for the decline in fertility.

Another notable trend relates to the increasing proportion of out-of-wedlock births in countries that did not experience as steep a decline in TFP compared to Singapore. Indeed, the proportions of births outside marriage in 25 countries mostly in Latin America are estimated at more than 60%, while in another 20 countries, including Belgium, Denmark, France, Norway and Sweden, the majority of births occur outside marriage, with government assistance typically provided to single mothers (Chamie, 2018). Meanwhile, 40% of children were born to single mothers in the United States in 2016 (Child Trends, 2018). East and South Asian societies are marked with strong disproval for births outside of marriage. Nevertheless, Myong and al. (2018) find the effects of stigma from single motherhood to be negligible compared to social norm of unequal distribution of the child care burden. Thus, policies that help promote fathers' involvement in child care may be warranted.

Since most married women tend to have at least one child, incentivising marriage through other policies than reducing the cost of child care on women may be considered. For example, policies such as shorter waiting list for Housing Development Board flats may help couples settle down earlier, which may reduce the delays in motherhood and increase fertility. We leave such interesting considerations for future research.

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