INCOME GROWTH, INEQUALITY AND MOBILITY TRENDS IN SINGAPORE

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1. INTRODUCTION & SUMMARY

1.1 **Income growth, inequality and mobility are key issues of concern for many countries across the world.**

- Real income growth provides an indication of how consumption and standards of living are improving;

- Income inequality examines the spread of incomes across a society;

- Intergenerational income mobility measures the extent to which individuals' incomes and their standing in the income ladder differs from their parents'.

1.2 **This paper reviews trends in income growth, inequality and mobility in Singapore**, using data from the Department of Statistics (DOS), and puts them in international perspective. Our key findings are as follows.

1.3 **First, Singapore households saw broad-based growth in real incomes over the last decade, with all household quintiles seeing significant gains**.

- While households in the top two income quintiles saw higher real growth in the first half of the last decade (2004 to 2009), this was reversed in the last five years (2009 to 2014) when households in the lowest two quintiles saw the fastest real income growth.

- As the lowest quintile (or bottom 20%) of households had seen little real income growth in the first half of the decade, even with rapid income growth in the last five years, they showed slower real income growth for the decade as a whole. However, at 24.1%, they still saw a significant improvement over the decade. Further, after taxes and transfers, the lowest quintile enjoyed the highest growth in incomes.

- Income growth in Singapore has generally exceeded that of countries within the same league. Household incomes for both the lower income (20th percentile) and median (50th percentile) households grew much faster than that of most developed countries and the other Asian NIEs over the past 10 years.

- Beyond income growth, we also briefly examined the economic circumstances of poorer households (i.e. the bottom quintile).[1] The bottom quintile is sometimes observed to spend more than their income, on average. However, this statistical average masks the fact that the bottom quintile of households is of a heterogeneous nature. About a third of this group comprises households that are relatively well-off[2] or who have already retired. These households would often have savings or income from their assets. Excluding such households, the

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[1] For this segment, we expand our definitions beyond citizen employed households, which was used in the analysis of income growth, to include the broader group of all resident households (includes households headed by permanent residents, retirees, etc).

[2] These "better-off" households are defined as households who live in private property, own more than one property, who employ more than one domestic helper, or who own more than one car.

expenditures of the remaining households in the bottom quintile has in fact been below their incomes on average.

1.4 **Second, we look at both long term and recent trends in income inequality. The data shows that Singapore's Gini coefficient has fluctuated above 0.40 since 1980. It has also declined somewhat in recent years, from a peak in 2007.**

- Since 1980, Singapore's Gini coefficient has gone through three main phases. First, the Gini declined in the 1980s from around 0.44 in 1980 to about 0.41 in 1990. Subsequently, the Gini increased in the 1990s and early 2000s to a peak of about 0.48 in 2007, in line with trends seen in the advanced economies. Since 2007, the Gini has declined.

- Singapore's Gini coefficient, when computed using the OECD method for the purpose of international comparability, is currently 0.43[3]. This is lower than the average for developed countries, before including taxes and transfers.

- After including taxes and transfers, Singapore's Gini falls to 0.37, reflecting the tilt in fiscal policies in favour of the lower- and middle-income groups. This reduction in Gini is less than in most of the OECD countries. However, the more extensive redistribution in these countries, via high levels of transfers, goes hand in hand with much higher overall taxes on the population, including their middle-income groups. Singapore has followed a different approach, with a lower tax burden overall and on the broad middle class in particular, while providing targeted subsidies for those in need.

1.5 **Third, in terms of intergenerational income mobility, we find that Singaporean cohorts in their thirties today have seen higher mobility compared to other countries.**

- Singapore fares well in both absolute and relative mobility when compared to other countries. In particular, children from the lowest income quintile of parents do better in Singapore than in a range of developed countries.

- Moreover, mobility estimates for this more recent cohort are broadly similar to that of cohorts nearly a decade older. Nevertheless, while Singapore's position remains more favourable than that of other societies, the experience of more mature societies suggests that maintaining the same level of mobility will be an increasing challenge over time.

1.6 **In summary, all countries strive to sustain income growth and mobility, while containing inequality.** Few countries have succeeded on all three fronts. Many developed countries have seen real incomes stagnate for the middle class over the last one to two decades; slowing social mobility; and a rise in inequality. Singapore has seen relatively strong income growth across a broad base of its citizens, as well as higher mobility than most other developed countries. This provides an important context for viewing income inequality. Singapore has nevertheless taken measures to mitigate inequality over the last decade.

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[3] For international comparisons to be accurately made, the OECD adopts a methodology that reflects differences due to household size (see also paragraph 3.5). The results using the OECD method are also published by DOS and shown in this document.

1.7   While Singapore has been relatively successful in achieving broad-based prosperity so far, managing these issues of income growth, inequality and mobility will not get easier in any society. They require effective and sustainable economic and social policies.

1.8   The rest of the paper is organised as follows:

- Section 2 presents income growth trends;
- Section 3 reviews income inequality trends;
- Section 4 then examines intergenerational income mobility trends;
- Section 5 concludes.

2. INCOME GROWTH TRENDS

Singaporean households have seen broad-based growth in incomes over the last decade with all household quintiles seeing significant gains

2.1   **Over the past decade, Singaporean households experienced broad-based growth in real income from work**. During the first half of the last decade (2004 to 2009), households in the top two income quintiles saw higher real income growth than those in the lower quintiles. This pattern then reversed in the last five years (2009 to 2014), when households in the lowest two quintiles saw the fastest real income growth [Figure 1A].

2.2   **If taxes and transfers are included, the lower- and middle-income households saw even higher growth in incomes.** [Figure 1B] shows how income growth has changed after income redistribution, where households are ranked by their monthly household income after taxes and transfers. Between 2004 and 2014, growth in the real incomes of households in the lower two quintiles, particularly the bottom 20%, was higher than that of the upper quintiles.

Figure 1: Cumulative Growth (%) of Real Average Monthly Household Income From Work Per Member by Quintiles (Among Citizen Employed Households)
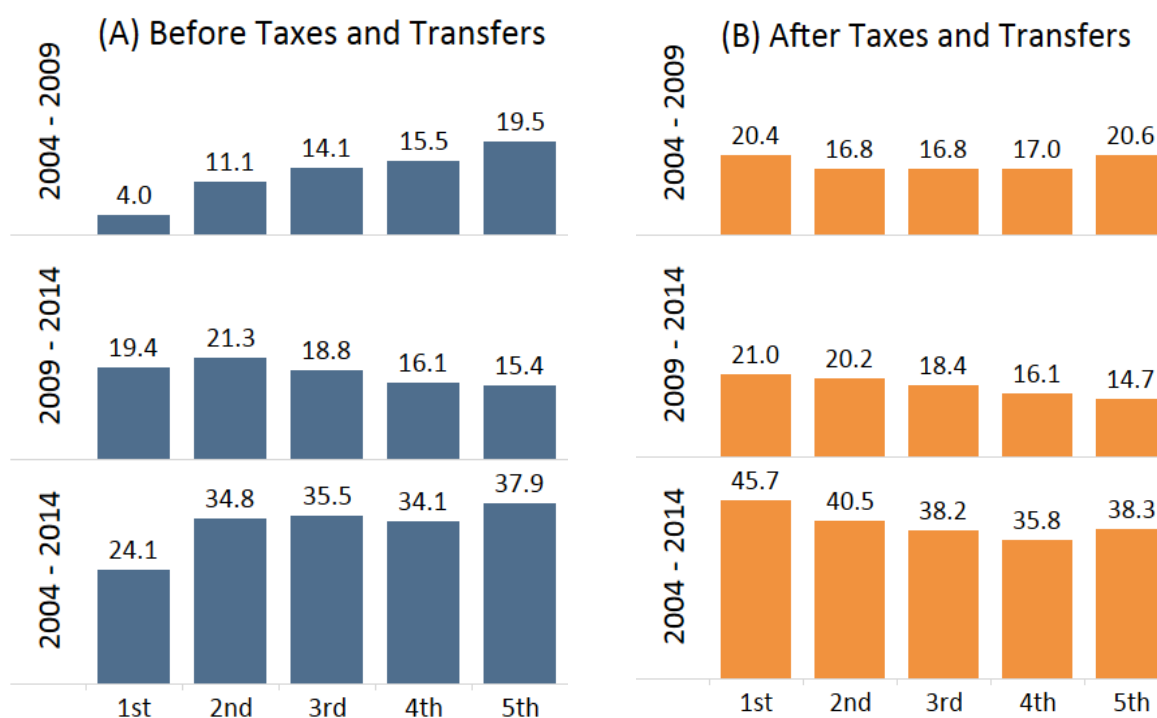
Note: Based on ranking of citizen employed households by monthly household income from work (including employer CPF contributions) per household member.

Note: Based on ranking of citizen employed households by their monthly household income from work (including employer CPF contributions) and government taxes and transfers per household member.

At the individual level, wages have also grown in the past decade

2.3 **Similar growth trends are found for individual wages of Singaporeans.** Over the last decade, the 20th percentile (P20) and median (P50) groups enjoyed real wage growth[4] that totalled 14.8% and 21.4% respectively. Compared to the first half of the decade (2004 to 2009), both groups also saw faster real wage growth in the last 5 years (2009 to 2014) [Table 1]. These trends in individual incomes, combined with increased participation in the labour force, also explain the strong growth of household income in the last decade.

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[4] The data is based on the Gross Monthly Income (GMI) from the Labour Force Survey, which is the most representative measure of wage growth in Singapore. Another wage measure is Occupational Wages, collected by the Occupational Wage Survey (OWS). This is sometimes used for the purpose of salary benchmarking for specific occupations in a particular year. However, it has significant drawbacks as a measure of wage growth over time. Unlike GMI, wage data in the OWS is subjected to compositional changes (i.e. changes in composition of jobs sampled within an occupational category), and also excludes bonuses. Hence, it is less suitable to be used for tracking changes in workers' general economic well-being over time, as compared to the GMI.

Table 1: Cumulative Growth (%) of Real Monthly Income from Work (Including Employer CPF Contributions) of Full-Time Employed Citizens

	2004 - 2009	2009 - 2014	2004 - 2014
P20	6.3	8.0	14.8
P50	9.4	10.8	21.4

Source: Ministry of Manpower (MOM), Labour Force Survey

Household income for the lower-income (P20) and median (P50) in Singapore grew faster than in several economies

2.4 **Broadly, income growth for lower-income households (P20) and median households (P50) in Singapore was generally found to be higher than in other countries[5].** Over the past decade, the lower-income and median households in several developed countries such as the UK, US and Finland, as well as the Asian NIEs (Newly Industrialised Economies), saw negative or low income growth. In contrast, real income for the P20 and P50 Singaporean households both grew by about 40% [Figures 2 and 3].

Figure 2: Cumulative Growth of Real P20 Household Income after Taxes and Transfers, Latest 10 Years
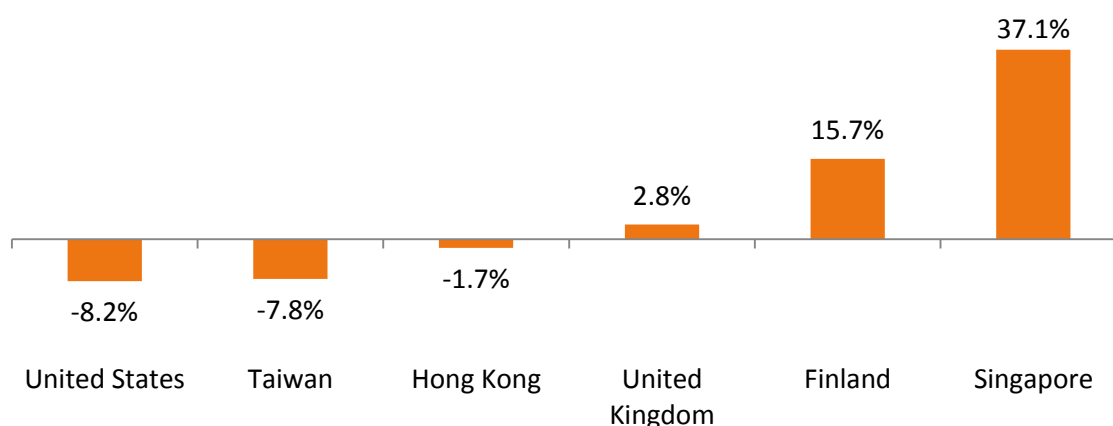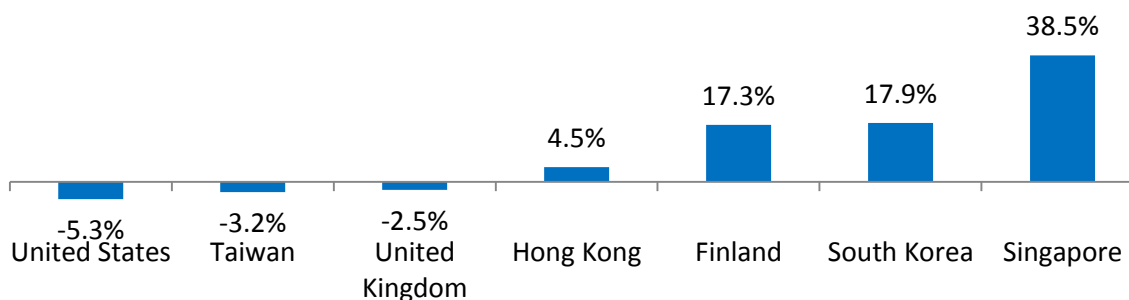

Sources: Data from National Statistical Offices and the IMF
Notes:
1. United States: real P20 total household income (after cash transfers), 2003 – 2013.
2. Taiwan: real P20 total household income (after taxes and transfers), 2003 – 2013.
3. Hong Kong: real P20 total household income (after cash transfers), 2001 – 2011.
4. United Kingdom: real equivalised P20 income (after direct taxes and cash transfers), 2003 – 2013.
5. Finland: real equivalised P20 income (after taxes and transfers), 2003 – 2013.
6. South Korea: P20 household income data is not available
7. Singapore: real P20 income from work (after taxes and transfers) per member among employed citizen households, 2004 – 2014.

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[5] Across countries, the definitions of incomes, taxes, transfers and household units are often different. However, since we are comparing growth rates between countries, the effect of such differences should be reduced.

Figure 3: Cumulative Growth of Real Median Household Incomes after Taxes and Transfers, Latest 10 Years

-5.3% United States	-3.2% Taiwan	-2.5% United Kingdom	4.5% Hong Kong	17.3% Finland	17.9% South Korea	38.5% Singapore

Sources: Data from National Statistical Offices and the IMF

Notes:
1. United States: real median total household income (after cash transfers), 2003 – 2013.
2. Taiwan: real median total household income (after taxes and transfers), 2003 – 2013.
3. United Kingdom: real equivalised median income (after direct taxes and cash transfers), 2003 – 2013.
4. Hong Kong: real median total household income (after cash transfers), 2001 – 2011.
5. Finland: real equivalised median income (after taxes and transfers), 2003 – 2013.
6. South Korea: real average total household income (after transfers), 2004 – 2014.
7. Singapore: real median income from work (after taxes and transfers) per member among employed citizen households, 2004 – 2014.

Box 1. *Economic circumstances of bottom quintile households*

Beyond growth in income from work, we briefly examined the economic circumstances of resident households in the bottom quintile using data on income from all sources from the *2012/13 Household Expenditure Survey (HES)*. Accordingly, the analysis here, which is based on the HES conducted every 5 years, is expanded to include all resident households.

The analysis showed that resident households in the bottom quintile are quite heterogeneous in nature, and consist of several co-mingled groups. Some households are in or near retirement, some may have little income but possess accumulated wealth. The bottom quintile contains such households alongside poor households with both low incomes and wealth. This heterogeneity means that statistical averages for this group have to be interpreted with care.

For example, the bottom quintile is sometimes observed to spend more than their income, on average. The expenditure-to-income ratio (EIR) among all bottom quintile resident households stood at 1.10 in 2012/13. However, using common indicators, we found that about one-third of the bottom quintile households are either:
(a) Retiree households[6], which no longer have an income stream; or
(b) "Better-off" households, which may have some resources. The indicators used to identify these "better-off" households include whether the household lives in private properties, owns more than one property, employs more than one domestic helper, or owns more than one car.

If we exclude such retiree and "better off" households that may be in a stage of decumulation of savings or have some wealth to support their consumption, the EIR of the remaining households is 0.89 [Table 2]. This underscores the need to consider life cycle factors when trying to obtain an accurate picture of households with low incomes.

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[6] For statistical purposes, the Department of Statistics defines a retiree household as one which comprises solely of non-working persons aged 60 years and above.

Table 2: Monthly Household Income and Expenditure of the Bottom Quintile Resident Households, 2012/13

	Household Income from all Sources (Including Employer CPF Contributions)	Household Expenditure (Excluding Imputed Rental of Owner-Occupied Accommodation)	Expenditure-to-income Ratio
Households in the bottom quintile	$2,022	$2,231	1.10
Households in the bottom quintile, excluding retiree households	$2,788	$2,680	0.96
Households in the bottom quintile, excluding "better-off" households	$2,179	$2,116	0.97
Households in the bottom quintile, excluding retiree and/or "better-off" households	$2,906	$2,574	0.89

Note: Resident households are ranked by income from all sources per member, after excluding retiree households and/or households with the following characteristics: live in private properties, own more than one property, employ more than one domestic helper, or own more than one car.

3. INCOME INEQUALITY TRENDS

The Gini coefficient of Singapore has fluctuated above 0.40 since 1980. It declined slightly in recent years from a peak in 2007.

3.1 **A common summary statistic for income distribution is the Gini coefficient for income from work that the Department of Statistics releases every year.** This is presented in its "Key Household Income Trend" paper[7] as a 10-year time series.

3.2 **In this paper, we looked at Gini coefficients for resident employed households over a longer time period, with estimates for years before 2000 presented for the first time.** The data are based on household income from work (including employer CPF contributions) among resident employed households, and coefficients before 2000 are estimated using the Censuses of Population (1980 and 1990), mid-decade General Household Survey (1995) and Comprehensive Labour Force Surveys (1997 to 1999).

3.3 **The best available data suggest that the Gini coefficient in Singapore went through three main phrases** [Figure 4]: First, the Gini coefficient declined in the 1980s from around the level of 0.44 in 1980 to about 0.41 in 1990. Subsequently, the Gini rose in the 1990s and early 2000s to a peak of about 0.48 in 2007, in line with trends seen in advanced countries. Third, since 2007, the Gini coefficient has declined slightly to about 0.46 by 2014.

3.4 The Gini coefficients above are based on a simple methodology, using incomes per household member. There are various international databases that seek to collate Gini coefficients for a large selection of countries. Within most databases, these comparisons are frequently based on different definitions, and different adjustments

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[7] In Singapore, household income data are based on the sample of households surveyed in the June Comprehensive Labour Force Survey (LFS) conducted by the Ministry of Manpower, except for 1980, 1990, 1995, 2000, 2005 and 2010. The data are compiled by the Department of Statistics (DOS). Income data refer to income received by working members of the household from employment and business.

for household size and composition. To enable more accurate international comparisons among developed countries, the OECD standardizes its methodology to reflect differences due to household size[8].

Figure 4: Long Term Trends in Gini Coefficients in Singapore – Before Taxes and Transfers
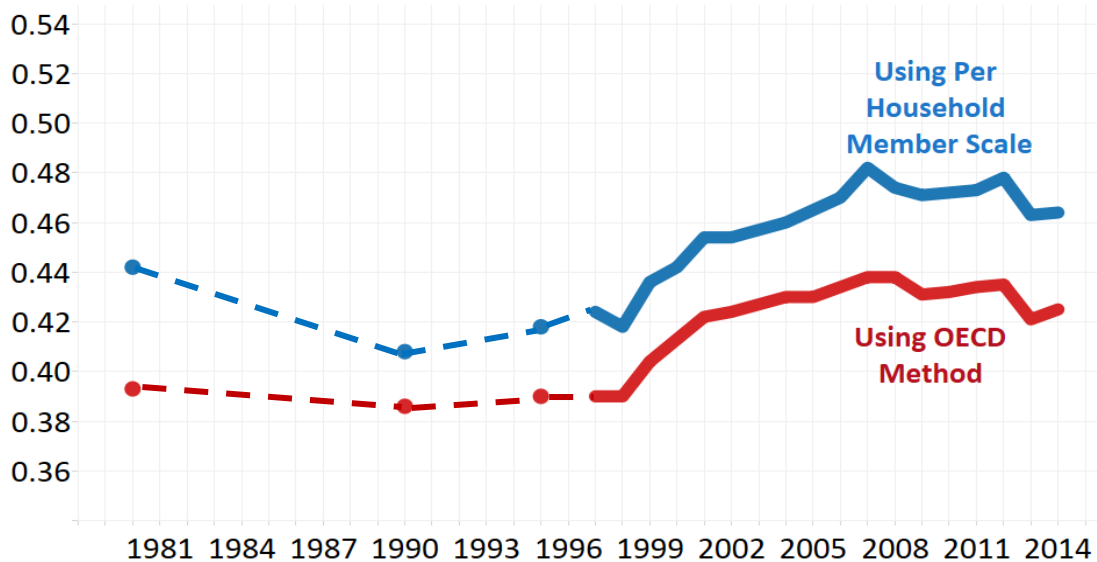
Source: DOS
Notes:
1. Based on household income from work among resident employed households.
2. OECD method: Please see paragraph 3.5.
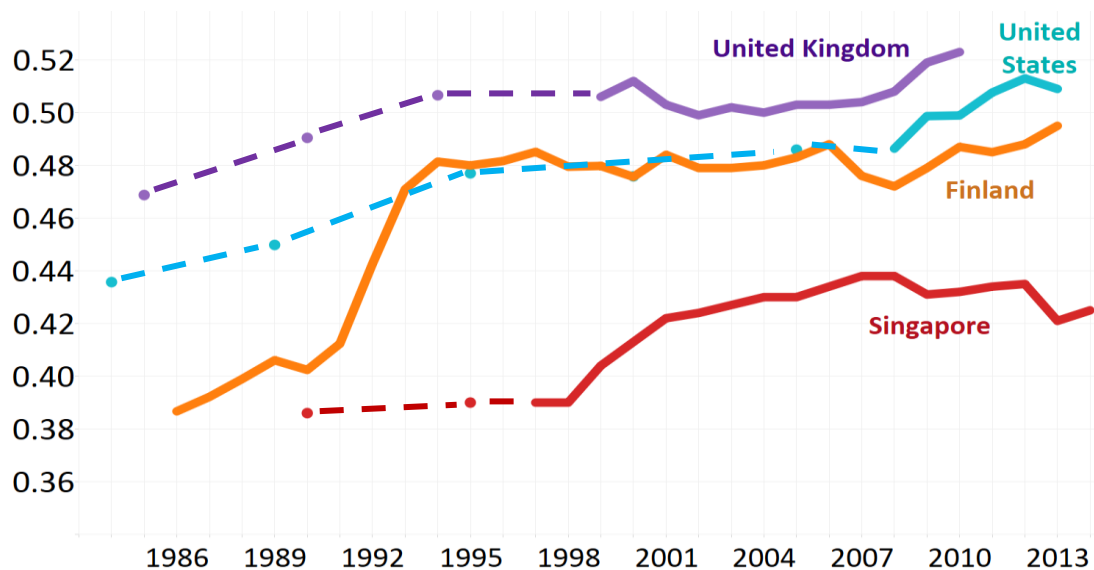3. Dotted lines are used for interpolation where data for particular years are not available.

The Gini coefficient of Singapore, based on before-taxes-and-transfers household income, compares well with most OECD countries

3.5   **Based on the OECD method, many mature countries have also experienced rising inequality over the years** [Figure 5]. Several factors, such as globalisation and technological changes, are generally cited as explanations. Singapore, like many other countries, is affected by these global trends.

3.6   **The statistics show that Singapore's Gini coefficient, before taxes and transfers, compares well with many developed economies.** Singapore's Gini coefficient, at 0.43 in 2014, is lower than the average across all OECD countries, which stood at 0.47 in the latest year[9].

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[8] The OECD method seeks to account for economies of scale with regard to household expenditures. It is otherwise known as the square-root scale.
[9] Singapore's Gini coefficient is computed based on income from work among resident employed households as such data is available every year. If the Gini for resident employed households were to be computed using household income from all sources based on the 5-yearly Household Expenditure Survey (HES) which was last conducted in 2013, the before tax and Government transfers Gini would be 0.43, which was slightly higher than the 0.42 obtained using household income from work in 2013.

Figure 5: Long Term Trends in Gini Coefficients (Based on OECD Method) for Selected Economies – Before Taxes and Transfers
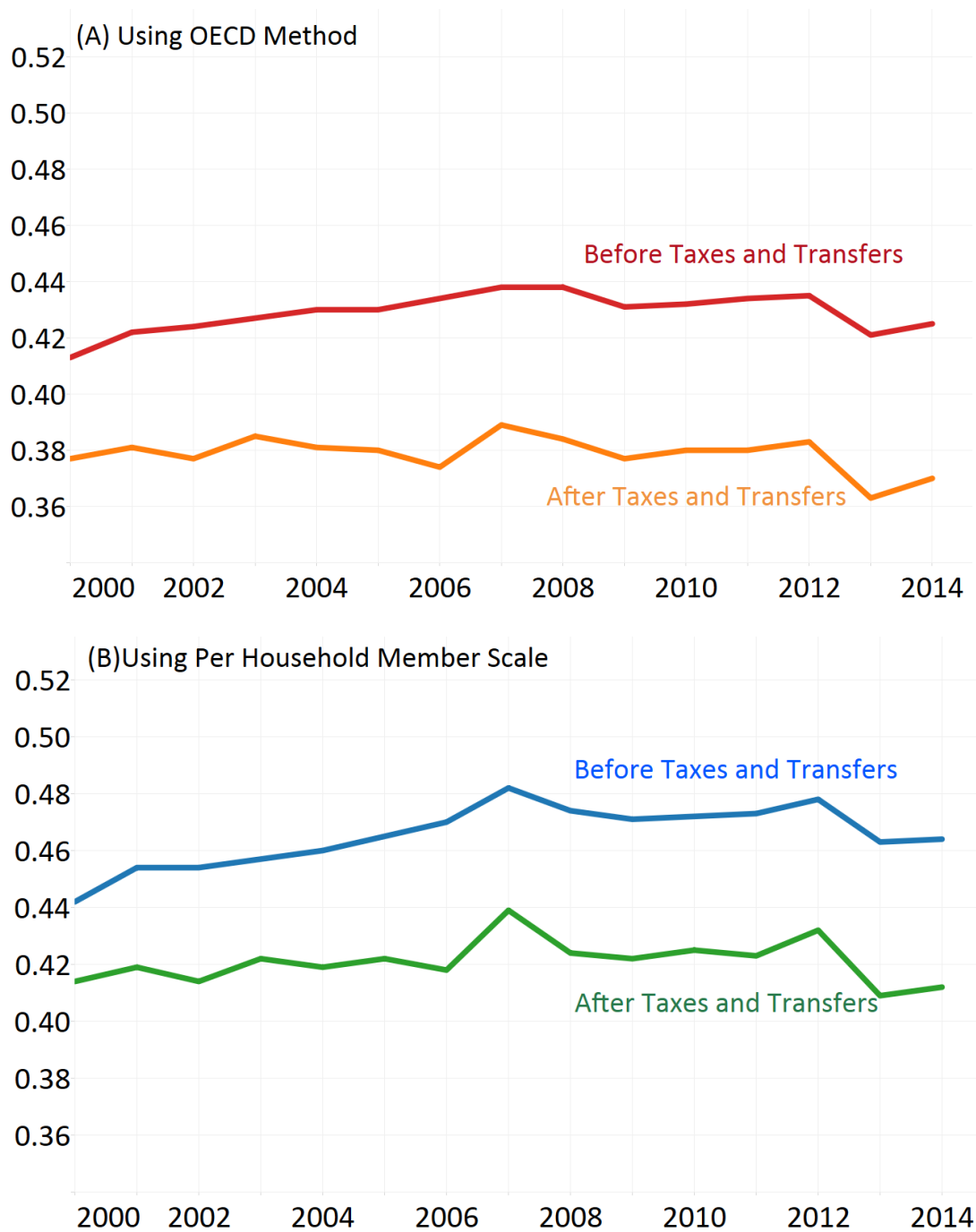
Notes:
1. Singapore: income from work among resident employed households.
2. UK, US and Finland: income from all sources among all households.
3. Based on OECD method – please see paragraph 3.5 – for all countries. Dotted lines are used for interpolation where data for particular years are not available.

After accounting for taxes and transfers, the Gini coefficient in Singapore is reduced by less than most OECD countries' with higher tax burdens

3.7 **The Gini coefficient of Singapore is reduced to 0.37** [Figure 6A] **after taking into account the effects of taxes and transfers.** The after-taxes-and-transfers Gini coefficient has remained fairly stable over the past fourteen years, even though the before-tax-and-transfers Gini coefficient increased. This partly reflects the expansion of social policies since 2007. For instance, the Government introduced the Workfare Income Supplement (WIS) scheme in 2007 to supplement the income and retirement savings of low-wage workers; and enhanced it in 2010 and 2013 to benefit more Singaporeans. The GST Voucher Scheme was also made permanent in 2012 to help low-income and elderly households partially offset their GST expenses.

**Figure 6: Singapore's Gini Coefficients Before and After Taxes and Transfers**

(A) Using OECD Method

Before Taxes and Transfers

After Taxes and Transfers

(B) Using Per Household Member Scale

Before Taxes and Transfers

After Taxes and Transfers

Source: DOS

Note: Based on latest data from DOS. DOS regularly reviews and expands the coverage of Government taxes and transfers, as more administrative data become available.

3.8 **The reduction in Singapore's Gini coefficient, from 0.43 to 0.37, is less than in most of the OECD countries. However, the larger reduction in Gini in these countries, which has been effected by high levels of transfers has generally gone hand in hand with higher overall taxes on the population.** [Figure 7] shows that the reduction in Gini coefficient is higher in countries that impose higher tax collections.

Figure 7: Total Tax Revenue (as a Percentage of GDP) VS. Reduction in Gini Coefficients due to Taxes and Transfers
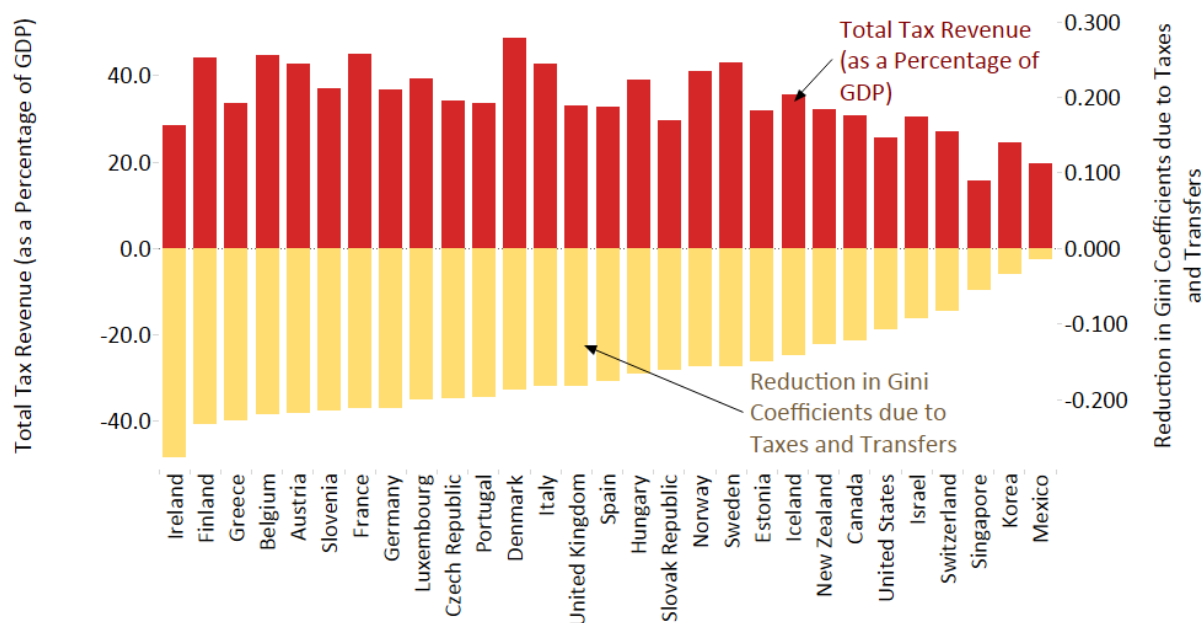
Sources: OECD, DOS

Notes:

1. Right axis measures the difference between the Gini coefficients pre- and post-net transfers.

2. Singapore: Data for 2014. Gini coefficients are based on income from work among resident employed households. Tax revenue: Includes all taxes, fees and charges.

3. OECD: Based on latest available year. Gini coefficients: 2010 for United Kingdom; 2011 for Canada; 2012 for Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Mexico, New Zealand, Norway, Portugal, Slovak Republic, Slovenia, Spain, Sweden and Switzerland; 2013 for Finland, Israel, Korea and United States; and 2014 for Hungary. Based on household income from all sources among all households. Tax revenue: Data for 2013. Defined as the revenues collected from taxes on income and profits, social security contributions, taxes levied on goods and services, payroll taxes, taxes on ownership and transfer of property and other taxes.

3.9   **These high overall taxes extend to the middle-income group.** [Table 3] suggests that redistribution to achieve a lower Gini coefficient entails significant taxation, including on the broad middle. This includes both high income taxes and consumption taxes. In addition, a rising challenge for countries with generous defined-benefits social security systems, or large government debts, is that of remaining financially sustainable over time, in order to not have higher taxes imposed on future generations.

3.10   **Singapore has followed a different approach from other countries**, with a lower tax burden overall and on the broad middle class in particular, while providing targeted subsidies for those in need.

Table 3: Tax Burden in Selected Economies

	Singapore[1]	Finland	Denmark	Sweden	Germany	France	Italy	United Kingdom	United States
Effective Personal Income Tax Rate for the Average Worker	2.0	22.6	35.6	17.4	19.1	14.6	22.1	14.4	17.2
Goods and Service Tax/ Value-Added Tax[2]	7	24	25	25	19	20	22	20	4 – 11[3]
Total Tax Revenue[2] (as a Percentage of GDP)	15.7[4]	44.0	48.6	42.8	36.7	45.0	42.6	32.9	25.4

*Sources: KPMG, OECD, MOF Estimates (for Singapore data)*
<u>Notes:</u>
1. Singapore: Data for 2014. Effective income tax rate on the median worker is close to zero. Tax revenue: Figure includes all taxes, fees and charges.
2. OECD: Data for 2013 (tax revenue) and 2014 (VAT). VAT refers to standard rate. Reduced rates may apply for some goods and services.
3. US: While the United States does not impose a national VAT, most states and some local governments impose a sales tax, which may range from 4 to 11%.

3.11   **The middle-income households in Singapore are net beneficiaries of the fiscal system.** For every dollar of tax paid, they received about $1.70 in benefits in 2014. The ratio is higher if we looked at the estimated figures for 2015. [Figure 8] shows that Singaporean middle-income households received more benefits per dollar of taxes paid than households in UK, US and Finland (for which data is more readily available).

Figure 8: Middle-income Households: Benefits Received Per Dollar of Taxes Paid
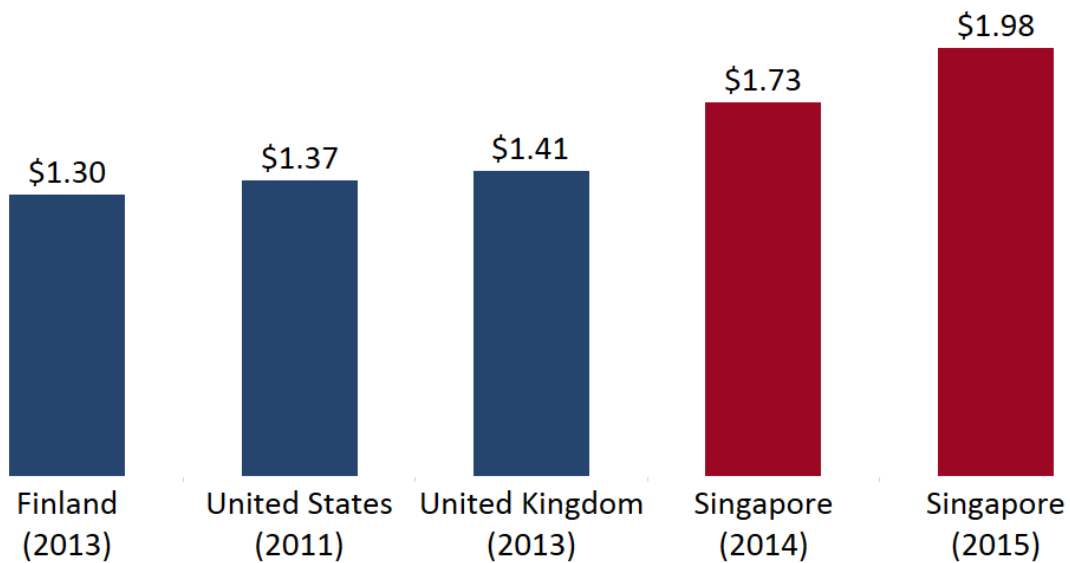
Sources: US Congressional Budget Office, Institute of Taxation and Economic Policy (ITEP), UK Office of National Statistics, Statistics Finland and MOF Estimates
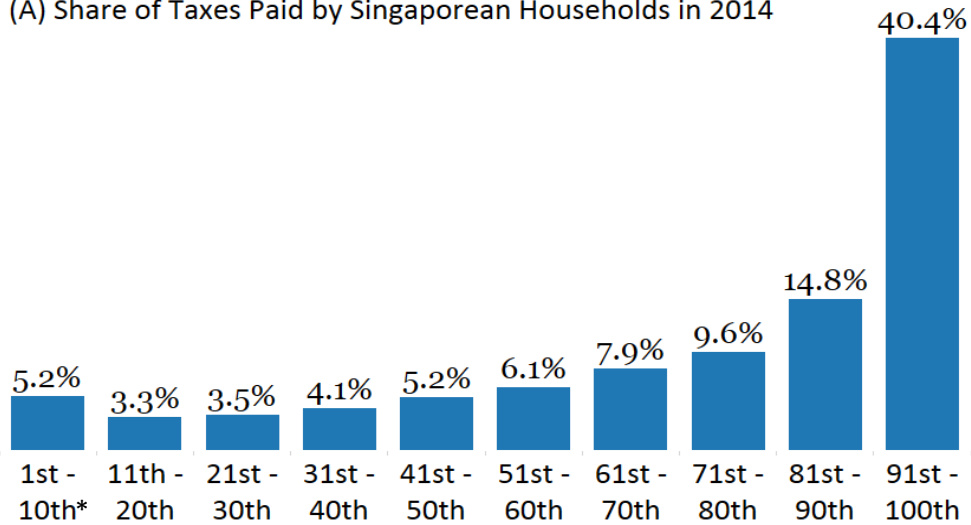
Notes:
1. Based on latest available year for the 41st – 60th percentile households.
2. Finland: Taxes include direct taxes, social security contributions, capital income taxes, municipal tax and estimated VAT *(source: Statistics Finland)*. Other local indirect taxes are <u>not</u> included. Benefits include schemes related to income security, health, old age, unemployment, families and children and housing.
3. US: Taxes include federal taxes (e.g. individual income taxes, payroll taxes) and estimated state and local taxes *(source: ITEP)*. Benefits include cash payments and in-kind benefits from federal, state and local governments.
4. UK: Taxes include direct taxes (income tax, National Insurance, Council Tax, Northern Ireland rates) and indirect taxes (e.g. VAT, custom duties, tobacco duties). Benefits include cash benefits (e.g. state pension, employment and support allowance) and benefits-in-kind.
5. Singapore: Data for 2015 is estimated. Taxes include all taxes: income tax, GST, property-related taxes, vehicle-related taxes, foreign domestic worker levies and other indirect taxes. Benefits refer to subsidies related to housing, education, health, employment, marriage and parenthood, social support and special transfers.

3.12   **Within the limits of Singapore's fiscal system, the distribution of taxes and transfers is progressive.** [Figure 9A] shows that the bottom 80% of households accounted for less than half of the taxes paid by households in 2014. On the other hand, social benefits are more concentrated among lower decile groups [Figure 9B] and they received support from the Government, ranging from universal subsidies, such as healthcare and education, to more tailored support for families with specific needs (for example ComCare).

Figure 9: Who Pays for Taxes? Who Gets the Benefits?

(A) Share of Taxes Paid by Singaporean Households in 2014

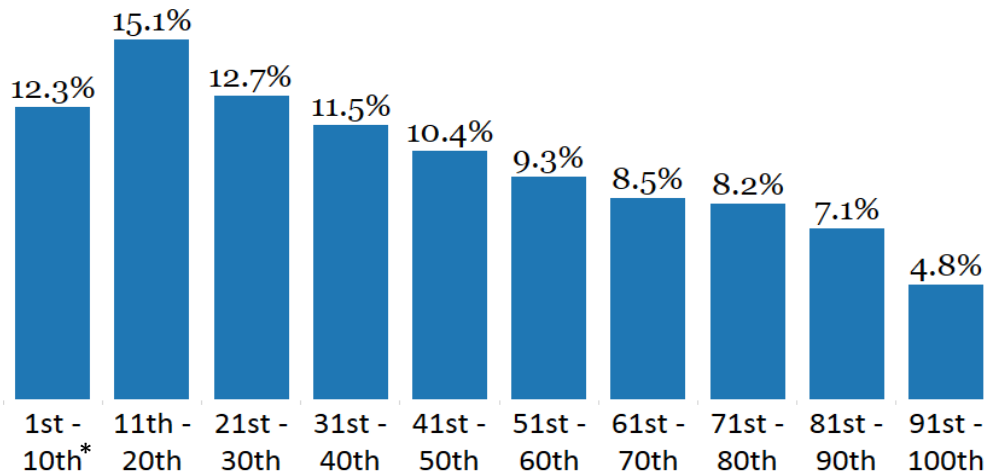| Decile	Share
1st - 10th*	5.2%
11th - 20th	3.3%
21st - 30th	3.5%
31st - 40th	4.1%
41st - 50th	5.2%
51st - 60th	6.1%
61st - 70th	7.9%
71st - 80th	9.6%
81st - 90th	14.8%
91st - 100th	40.4%

Source: MOF Estimates

* The first decile of households (by incomes per member) paid a higher proportion of taxes than the second decile. This arises because not all the households in the 1st decile are poor. This can be seen from the profile of the first decile households: 16% of them live in private properties, 13% in HDB 5-room and Executive flats, 14% own cars, and 10% employ a maid.

Note: Based on ranking of households using household income from work per member among Singaporean households. Data are on a per member basis and include housing grants and stamp duties.

(B) Share of Transfers Received by Singaporean Households in 2014

Decile	Share
1st - 10th*	12.3%
11th - 20th	15.1%
21st - 30th	12.7%
31st - 40th	11.5%
41st - 50th	10.4%
51st - 60th	9.3%
61st - 70th	8.5%
71st - 80th	8.2%
81st - 90th	7.1%
91st - 100th	4.8%

Source: MOF Estimates

* The first decile of households (by incomes per member) received a lower proportion of benefits than the second decile. This arises because not all the households in the 1st decile are poor. This can be seen from the profile of the first decile households: 16% of them live in private properties, 13% in HDB 5-room and Executive flats, 14% own cars, and 10% employ a maid.

Note: Based on ranking of households using household income from work per member among Singaporean households. Data are on a per member basis and include housing grants and stamp duties.

4. INTERGENERATIONAL MOBILITY IN SINGAPORE[10]

4.1   **Besides income growth and inequality, a third key issue for many societies is income mobility across generations, i.e. whether the children from lower-income parents have a fair chance of making it to the top**. More specifically, the term "absolute mobility" is often used to describe whether children are able to earn higher incomes than their parents while the term "relative mobility" describes whether children can move into a higher income percentile within their own cohort, compared to their parents. A corollary of relative mobility is that if someone is moving upwards, someone else must be moving downwards. It is a concept that describes fluidity in a society.

4.2   **In this section, three measures of intergenerational income mobility in Singapore were examined**:

   a. **Overall mobility**: which is conceptually a mixture of "absolute" and "relative" mobility, as measured by the correlation between the income of sons and their fathers
   b. **Absolute mobility**: as measured by the difference in income levels between sons and their fathers
   c. **Relative mobility**: as measured by the relationship between the income ranks of children within their own birth cohorts and that of their fathers

Overall mobility: Singapore performs well relative to other countries

4.3   **The first measure of income mobility is an estimate of the intergenerational correlation coefficient between the incomes of fathers and their eldest sons.** This approach is common in economic literature following Solon (1992), and updates an earlier paper issued by the Ministry of Finance (Yip, 2012). Lower correlation coefficients imply that sons' incomes are less closely related to their fathers' income and it indicates that mobility is higher.

4.4   **For cohorts who were born between 1978 and 1982[11], it was estimated that the coefficient for the annual incomes of fathers and their eldest sons is about 0.19 – lower than that found for many other countries in the literature, at 0.20 to 0.34** [Table 4]. This suggests that intergenerational income mobility in Singapore is relatively high compared to other countries.

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[10] This section is based on studies that were carried out in collaboration with the Ministry of Trade and Industry.
[11] These cohorts were chosen because younger cohorts may not have completed formal education and begun working.

Table 4: International comparison of correlation coefficients for income mobility

	Correlation coefficient	*Child's age when measured*	*Child's year of measurement*
US	0.34	29-32	2011-2012
Japan	0.34	30-59	2005
UK	0.33	34	2004
Denmark*	0.27	19-51	2009-2011
Canada	0.20	29-32	1995
Singapore (1978-1982 cohort)	**0.19**	**26-34**	**2008-2012**

* Data for Denmark is based on overall wealth instead of income.
Sources**:**
Blanden & Machin, 2008; Boserup, Kopczuk & Kreiner, 2013; Chetty, Hendren, Kline & Saez, 2014; Corak & Heisz, 1998; Lefranc, Fumiaki & Takashi, 2013; MOF-estimates using the latest available administrative data

4.5 **This is roughly similar to the estimate of 0.22 obtained in the earlier study issued by the Ministry of Finance, which found that mobility in Singapore was moderately high.** These results suggest that the father-son income correlation for the 1978-1982 cohorts was not too different from the 1974-1978 cohorts'.[12]

Absolute mobility: Singaporeans generally earned more than their fathers did

4.6 **The same cohorts of Singaporeans also enjoyed higher incomes than the preceding generation, even after correcting for increases in the cost of living.** The real median income of all sons born from 1978-1982 at age 30 exceeded that of their fathers at age 48, by about 35% [Figure 10]. Moreover, the majority of sons (61%) earned more than their fathers. The results imply that the standard of living for these sons was, on the whole, higher than that of their fathers. While the incomes of fathers and sons were measured at different ages due to data availability, in our view the increase of 35% is likely to be an underestimate as the sons' real wages would continue to increase with work experience, and would likely further exceed their father's by the age of 48.

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[12] These two cohorts were measured at roughly similar ages. The 1974-1978 cohorts were measured when average age of sons and fathers were 32 and 51 respectively whereas the 1978-1982 cohorts and their fathers were measured at ages of 30 and 47 respectively.   The earlier paper reported father-son correlations using monthly and annual incomes, but focused attention on the former which was considered a closer proxy of "permanent" income. However, estimates available from other countries use annual incomes, and this paper thus focuses on annual incomes for better international comparability. More details of the methodology can be found in the [Annex].

Figure 10: Real median incomes for sons born in 1978-1982 and their fathers
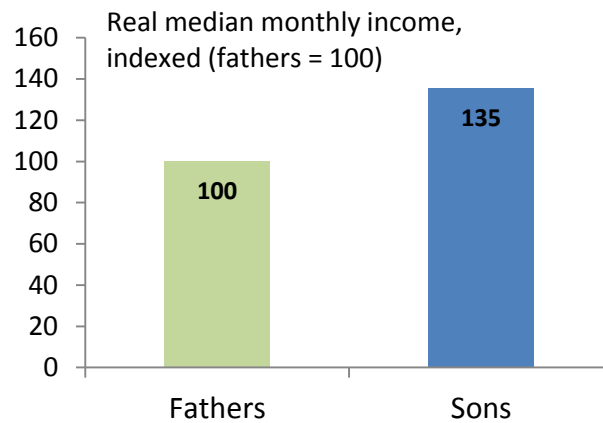
	Fathers	Sons
Average age when incomes were measured	48	30

Relative mobility: Singaporeans have seen a higher chance of moving up in income ranks, compared to other countries

4.7 **The final measure of intergenerational mobility studied in this paper focuses on "relative mobility" i.e. how a child's relative income rank changes compared to his or her father's rank.** Similar to recent economic literature for the US (Chetty et al, 2014), this approach involves ranking each child by income against all in his/her birth cohort and gender. The fathers of these children are then ranked against each other by income. This process allowed the relationship between the income ranks of father and child to be studied. Of particular importance are the incomes of less advantaged children; accordingly, [Figure 11] examines the income ranks of children whose fathers are in the lowest income quintile.

4.8 **Compared to similar age cohorts in other countries, children from poorer parents in Singapore experienced higher mobility.** Specifically, only 24% of Singaporean children born to the lowest quintile of parents remained in the lowest quintile among their own cohorts, compared to about 34% in the US [Figure 11A]. Moreover, 14% of Singaporean children from the lowest quintile of parents managed to reach the top quintile among their own cohorts, higher than the figure of 7.5% for the US, as well as the corresponding figures for the UK, Denmark and Canada [Figure 11B].[13]
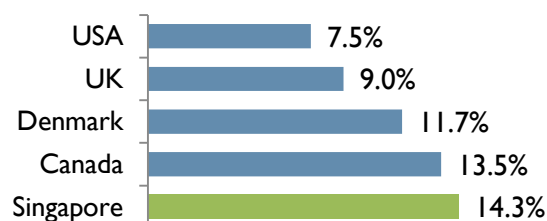
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[13] Obtained from Chetty (2015).

Figure 11: Among children born to parents in the bottom 20% of incomes…

Figure 11A: …How many reached each income quintile (%)?

	Child's Quintile				
	1st	2nd	3rd	4th	5th
US	33.7	28.0	18.4	12.3	7.5
S'pore	24.0	22.0	20.9	18.8	14.3

Figure 11B: …How many reached the top 20% of income?

Country	Percentage
USA	7.5%
UK	9.0%
Denmark	11.7%
Canada	13.5%
Singapore	14.3%

Relative Mobility: Relative mobility in Singapore has also remained fairly stable over time

4.9   **Lastly, to assess if mobility has changed, we compared the correlation coefficient of the income rank of children and that of their fathers for two different cohort groups, the 1969-1973 cohorts and the 1978-1982 cohorts.** This methodology, adapted from Chetty et al (2014), helps control for the differences in age between the two cohort groups as income *rank* is expected to change less than income *levels* as a cohort ages. This aids the comparison of intergenerational mobility for different cohorts.[14]

4.10   **The results showed that the income rank correlation coefficients for two cohort groups, of those born in 1978-1982 and those born in 1969-1973, are similar.** They suggest that the degree of intergenerational mobility in Singapore has remained similar between these cohorts [Table 5].

Table 5: Correlation coefficients for different cohort groups

	Coefficient
1969-1973 cohort	0.21
1978-1982 cohort	0.22

4.11   **Overall, the relatively high mobility estimates for Singapore likely reflect the rapid economic transformation that occurred during the period when these cohorts grew up.** During the 1980s and 1990s, Singapore's rapid transformation was accompanied by a significant expansion in education and job opportunities and Singaporeans who came of age during this period would have enjoyed opportunities that their parents did not. These may have been the main institutional factors accounting for the high mobility of these cohorts.

4.12   **As the pace of Singapore's development slows, it will be an increasing challenge to sustain such mobility in the future.** Nevertheless, it remains critical that society offers a level playing field for new cohorts of Singaporeans, especially early in life.

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[14] Please refer to the [Annex] for a detailed explanation. In order to control for differences in the ages of fathers between the two cohort groups, a ranking process slightly modified from Chetty et al (2014) was utilised.

5. CONCLUSION

5.1   All countries strive to sustain income growth and mobility, while containing inequality. Few countries have succeeded on all three fronts. Many developed countries have seen real incomes stagnate for the middle class over the last one to two decades; slowing social mobility; and a rise in inequality. Singapore has seen relatively strong income growth across a broad base of its citizens, as well as higher mobility than most other developed countries. This provides an important context for viewing income inequality. Singapore has nevertheless taken measures to mitigate inequality over the last decade.

5.2   While Singapore has been relatively successful in achieving broad-based prosperity so far, managing these issues of income growth, inequality and mobility will not get easier in any society. They require effective and sustainable economic and social policies.

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<u>Annex</u> - Methodology for the study on intergenerational income mobility

DATA

The data used in the study consist of administrative data of a longitudinal nature, and include income records, year of birth and parent-child linkage indicators for the period of 1996 to 2012.

The study examined about 41,000 pairs of eldest sons and their fathers. The eldest sons were from the birth cohorts of 1978-1982, and were between 26 and 30 years when their incomes were first measured in 2008. These cohorts were chosen as they were the most recent five-year cohort which had largely completed formal education and begun earning incomes.

MEASURING THE CORRELATION COEFFICIENT FOR OVERALL MOBILITY

The first measure of mobility, the intergenerational correlation coefficient, follows a common methodology in the literature (Solon, 1992) and updates an earlier paper issued by the Ministry of Finance (Yip, 2012). For each eldest son-father pair indexed by *i*, the following equation is estimated. The coefficient of interest, β_1, estimates the average relationship between incomes of fathers and sons:

$$Y_{es,i,t2} = \beta_o + \beta_1 Y_{father,i,t1} + \beta_2 Age_{father,i,t1} + \beta_3 Age^2{}_{father,i,t1} + \beta_4 Age_{es,i,t2} + \beta_5 Age^2{}_{es,i,t2}$$

where the dependent variable, $Y_{es,i,t2}$, is the log of the eldest son's income in time period t2 (2008-2012), and $Y_{father,i,t1}$ is the log of the father's income in time period t1 (1996-2000).

The incomes of fathers and their eldest sons should ideally be measured at similar ages. However, data was only available from 1996 to 2012. Due to this constraint, the age of our sample of eldest sons was around 30 in period t2, while their fathers on average were in their late forties in period t1, the earliest five-year period for which data was available. We include quadratic terms for the ages of fathers and their sons to control for age.

Because the variance in income tends to differ over the life cycle, the regression coefficient, β_1, is further scaled by the ratio of the standard deviation of the father's income to the standard deviation of the son's income to obtain ρ, the intergenerational correlation coefficient.

$$\rho = \beta_1 \left(\frac{\sigma_{\overline{income}_{father,i,t1}}}{\sigma_{\overline{income}_{es,i,t2}}} \right)$$

MEASUREMENT OF INCOME

Studies of intergenerational mobility tend to differ in data choices, with various authors making different decisions. In particular, studies differ in the ages at which incomes are measured and whether incomes are measured in one year or averaged over multiple years. This section discusses two key data choices used.

(I) Annual Income vs. Monthly Employment Income

Our data enables two measures of income:

(i)   annual income, which is the total income from work earned over the course of a year;

(ii)   monthly employment income, which is the average monthly income <u>in months that are actually worked</u>.

As an example, a worker earning $2000 a month, but who was only employed for 3 months in a year, would have an annual income of $6000 and a monthly employment income of $2000.

As also noted in the previous paper issued by the Ministry of Finance, income mobility requires obtaining a close proxy of "permanent" income. Taking multi-period averages of incomes is a way to do so, as it averages out other sources of "noise" in the data.   Using monthly incomes further reduces the "noise" coming from the variation in the number of months worked in a year. These adjustments decrease what is known as "attenuation bias" in the estimates which is a key problem in the literature. Consequently, the father-son correlation coefficient tends to be higher when monthly employment income is used, compared to annual income. As shown in [Table A1] below, for the 1978-1982 cohorts, the correlation coefficient is 0.28 when monthly income is used, compared to 0.19 for annual income.

Table A1: Correlation coefficients for different income measures (1978-1982 cohorts)

	Annual income	Monthly income
Correlation coefficient (ρ)	0.19	0.28

On the other hand, income mobility can only be measured with available data, and the reviewed studies from other countries all used the annual income measure. **Therefore, annual income was selected as our measure of choice so that the results of this study are more comparable internationally.**

(II) Averaging incomes

Since averaging incomes reduces attenuation bias, averaging over more periods is better. However this is limited by data availability. Other studies have tended to average incomes over periods ranging from one to five years.

We chose to average the income of both fathers and their eldest sons over five years in order to reduce the impact of transitory fluctuations in income, in line with key papers (e.g. Solon, 1989). We similarly average the incomes of the eldest sons over five years to reduce transitory fluctuations in income. Accordingly, the income of the eldest sons was averaged over the period of 2008-2012 while the income of their fathers was averaged over the period of 1996-2000. As seen in [Table A2], this adjustment led to an increase in our correlation coefficient (i.e. we estimated a lower level of mobility).

Table A2: Correlation coefficients when averaging son's income over different periods (1978-1982 cohorts)

Son's income measured in...		Annual income	Monthly income
Single year	2008	0.11	0.19
	2012	0.15	0.24
5-year average	2008 – 2012	0.19	0.28

In short, these choices in the treatment of data were taken to reduce bias as much as the data allows.

EXAMINING RELATIVE MOBILITY

Another measure – relative mobility – was recently used in the US by Chetty et al (2014); our analysis on relative mobility follows it closely. As per Chetty et al's study, we expand our sample of children to all children instead of just the eldest sons used in Solon (1992), and rank the income of each child against all children of the same birth year and gender. Fathers are ranked by their child's birth/gender cohorts, regardless of the father's age. This ranking process allows us to compare the result with the US' [Figure 11 in the main text].

However, Chetty et al's method of ranking fathers does not account for differences in their ages. To account for this in [Table 3] in the main text, we alter the ranking process slightly by ranking fathers the same way as we rank the sons, that is, against all males born in the same year. This ranking process will control for differences in the age among fathers as well as among their children.[15]

With this new approach, we estimate the equation for the two cohort groups (i.e. 1978-1982 and 1969-1973), with each child-father pair indexed by *i*:

$$Y_{rank\_child,i,t2} = B_o + \beta_1 Y_{rank\_father,i,t1}$$

where the dependent variable, $Y_{rank\_child,i,t2}$, is the income rank a child in time period t2 within his cohort, and $Y_{rank\_father,i,t1}$ is the income rank of the father in time period t1 within his cohort. The age of the father and the child are already controlled for via the ranking process.

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[15] This alteration does not significantly change the results compared to Chetty et al's methodology.