Myths and Facts about Inequalities in Thailand

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Abstract

This paper analyzes inequalities in Thailand over the past three decades and the implications of Covid-19 on existing inequalities. We show that while total income and consumption inequalities in Thailand have been declining, it raises concerns regarding some drivers behind the declining trends. First, the decline in income inequality among the older households is largely driven by private transfers. Given Thailand's demographic transformation into aging society, this channel is not sustainable. Second, despite the increasing longevity trend, household heads aged 55-69 years old have become inactive in the labor markets over the years. Among active households, the earnings inequality among households who mainly earn from farming activities has risen. However, such increase was masked at the aggregate level because of the higher shares of households working in non-farm sectors and the decline in their earnings inequality. Third, while consumption inequality has fallen similarly to income inequality for all age groups, the low-income households remain highly exposed to income shock. These poor households have much higher shares of essential spending, which are harder to adjust. Finally, while the full effects of Covid-19 on inequality are still unfolding, our evidence shows that in the short-run the poor and the low educated are vulnerable to job and earnings losses.

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1. Introduction

Over the past few decades, Thailand has undergone structural changes in several dimensions - ranging from a decline in agricultural sector to expansion of educational opportunities as well as aging population. In addition, public transfer programs have become more expansive and generous. The extent to which such structural shifts have shaped income and consumption inequalities remains unanswered. What types of households thrive and what types lose out? Above all, understanding how the presence of covid-19 may impact existing inequalities is highly relevant for policy making nowadays.

This study takes an evidence-base empirical approach to tackle these crucial questions by exploiting two main national-representative datasets with long time span - (i) Thailand's Household Socio-Economic Survey (SES), and (ii) Thailand's Labor Force Survey (LFS). Our empirical analysis demonstrates that at the time when we observe a decline in total income inequality over the past three decades, a deeper investigation reveals two other stylised observations, which suggests that the pattern of inequality is not homogenous across different groups of households.

First, the decline in income inequality among households in their post prime-age (older than 55) is largely driven by the redistributive role of private transfers, pension and government assistance over the years. We show this by counterfactually removing different income sources from total incomes. When private transfers are counterfactually omitted, the income inequality among post prime-age households significantly increases. However, given the trend of lower fertility, this channel of additional income may not be sustainable. In contrast, a counterfactual removal of pension resulted in a decline in the level of income inequality. This reflects the regressive structure of Thailand's pension system where those who have access to formal pension benefits are concentrated in the top part of the income distribution.

Second, despite the increasing longevity, there has been a larger share of households with head aged 55-69 years old being economically inactive in the labor market. Among active households, the earnings inequality among households engaging mainly in farming has risen while the inequality among households engaging mainly in non-farming has fallen. We document that non-farming households are mostly in the top part of the earnings distribution and farming households are in the bottom part for all years. There is also a significant shift from farming to non-farming sector among households in the middle part. Since earnings inequality among non-farming households is on a declining trend, the shift toward this group helps offset the rise in earnings inequality among farming households.

While the inequality among non-farming households has declined, this is not without a concern. Farming households are mostly low educated, but non-farming households include a composition of households with different educational attainments. The compressed earnings distribution among non-farming households is driven by both the decline in inequality among households within the same education group and the decline in inequality between education groups. The latter is driven by the stagnant earnings growth of the middle and high school educated groups, and these groups are larger over time.

In terms of consumption, we show that consumption inequality has tracked income inequality well over time. However, while consumption inequality has fallen, the high share of essential spending among low-income households make them less able to adjust consumption in response to negative income shocks. The lower spending on education per child of poor households also implies that social mobility of their children could be limited. Further, we document that high-income households spend more on telecommunication expenditure and activities that are likely to be suspended during the pandemic (e.g. travelling, recreational activities and personal services). This yields two crucial implications. First, the higher spending on telecommunication at the eve of the pandemic means that high-income households could be more equipped to work remotely helping them to minimize income losses. Second, high-income households can adjust their expenditure more during the pandemic from not being able to travel or use personal services, and thus may not need to reduce their remittances in face of negative income shocks.

We confirmed these implications from the SES using the LFS. As noted in Lekfuangfu et al. (2020), high-income workers are more likely to work in sectors with more flexibility to work remotely and less physical proximity at the workplace. We find that workers in this type of occupations experienced less disruption as shown in a smaller reduction of earnings compared to other groups. Earnings inequality has increased substantially between the first and second quarters of 2020. Further, the data shows that in contrast to high school and college households, primary and middle educated households who tend to have lower incomes have reduced their remittances. In effect, the pandemic impact of one household can spill over into other households through a reduction in private transfers.

This paper is closely related to papers studying inequalities in Thailand. Earlier studies find that Thailand's income inequality is inversely related to the country's economic growth. The country's income inequality increased between 1970s and the early 1990s where its economy grew relatively fast (Kakwani and Krongkaew, 2003; Jeong, 2008). During the mid-1990s to the mid-2010s, Thailand's inequality has reportedly declined (Paweenawat and McNown, 2014; World Bank, 2016; Kilenthong, 2016; UN-ESCAP, 2018; See Figure 2). Recent work by Jenmana (2018) combines SES data with tax return data and national account and shows that using the household survey alone is likely underestimated the level of income inequality. However, his income inequality estimates still declined between 2001 and 2016. With respect to consumption and wealth dimension, Kilenthong (2016) reports that both consumption inequality and wealth inequality (proxied by vehicle and mobile phone possession) declined between 1998 and 2013.

Additionally, this paper is related to recent works on the implications of Covid-19 on inequalities. Our finding that the pandemic has exacerbated inequalities, although focussing on a different country, is in line with Blundell et al (2020) and Adams et al (2020) who focus on the UK. This paper contributes to the inequality literature by examining the implications of economic structural changes on variations in income and consumption as well as how the pandemic may exacerbate existing inequalities.

The rest of the paper is organised as follows. Section 2 describes the structural changes in Thailand and the data. Section 3 shows inequality trends at the aggregate level

over time and over the life-cycle. Section 4 analyses the anatomy of the income distribution and section 5 examines consumption. Section 6 assesses the impact of Covid-19 and section 7 provides conclusion and discussion.

2. Overview of the Thai economy and data

2.1 Structural changes in Thailand

There are three key structural changes in Thailand over the past decades. First, Thai households are aging with older household heads, and fewer young members. Over the past 30 years, the average head of household increased from 45 to 54 years old (see Table 1). The fraction of heads aged at least 55 years old increased from 28% to 51%. The number of children declined while the number of elderly (aged 60 years or over) increased. While both the number of earners and household size fell over time, the number of earners per household members slightly increased from 0.60 to 0.62.

Table 1: Household characteristics overtime

	1988	**1994**	**2000**	**2006**	**2013**	**2019**
Head age	45	47	49	50	53	54
1 if head age 15-24	0.05	0.04	0.03	0.03	0.03	0.03
1 if head age 25-54	0.67	0.64	0.63	0.60	0.52	0.46
1 if head age 55 or older	0.28	0.32	0.34	0.37	0.45	0.51
Number of children age 14 or younger	1.42	1.11	0.99	0.86	0.59	0.44
Total number of elderly	0.33	0.38	0.43	0.45	0.53	0.63
Household size	4.12	3.77	3.62	3.34	3.04	2.72
Number of earners	2.39	2.11	1.98	1.88	1.77	1.58
Number of earners/ household size	0.60	0.59	0.58	0.60	0.62	0.62
Education (HH head)						
primary or lower	0.88	0.83	0.77	0.72	0.67	0.61
middle school (M1-M3)	0.05	0.06	0.08	0.09	0.09	0.11
high school (M4-M6)	0.03	0.04	0.06	0.11	0.13	0.16
vocational or college	0.05	0.06	0.09	0.08	0.10	0.12
Industry (HH head)						
agricultural, fishing & mining	0.58	0.45	0.41	0.37	0.33	0.25
manufacturing	0.05	0.08	0.09	0.10	0.10	0.11
construction	0.03	0.05	0.04	0.05	0.05	0.05
trade	0.08	0.10	0.10	0.10	0.10	0.11
utility services & transportation	0.03	0.03	0.04	0.04	0.03	0.03
other services	0.11	0.14	0.14	0.15	0.16	0.17
inactive	0.13	0.16	0.19	0.19	0.23	0.28

Second, the middle panel shows that there is an increasing trend in education levels in Thailand. The fraction of household heads who have primary education decreased substantially over time while this figure for vocational or college education rose twice as much. Third, Thailand has witnessed a substantial shift of employment share from agriculture to manufacturing as shown in the bottom panel of Table 1. The share of household heads working in the agriculture sector declined from 58 percent in 1988 to 25 percent in 2019, while this figure in manufacturing has doubled over this period. Additionally, the share of

household heads being inactive increased from 13 percent to more than double (28 percent). We examine the implications of these structural changes on inequalities over time.

2.2 Data and definitions

Our study uses two datasets, both of which are repeated cross-section and representative sample of households in Thailand – namely Thailand's Household Socio-Economic Survey (SES), and Thailand's Labor Force Survey (LFS).

The SES provides detailed information on both households' incomes and consumption from 1988 to 2020 and household wealth in later years. On the other hand, the LFS has mainly incomes and little information on consumption. Therefore, to understand the dynamics of income, consumption and wealth inequalities in Thailand, we use the SES as our main dataset. We supplement our analysis on the effects of Covid-19 on income and labor market inequalities using the LFS. We describe each dataset and key variables briefly below and in detail in Appendix A.

The SES is collected biannually from 1988-2009 and became annually since 2011. The sample size increased from approximately 10,000 households in 1988 to 43,000 households since 2006. Information on household income is available for every wave until 2009 and biannual thereafter.[1] We focus on household monthly income which is defined as the average income per month in the past year.[2] The total income is the sum of three major components: (1) earnings (2) transfers or pension payment; and (3) capital income. Earnings are incomes from wage/salary, farm or business profits, and in-kind.

Information on household expenditure is collected in every wave. Major components are expenditure on food consumption and non-food consumption (e.g. durable goods, services, education, healthcare expenses) and on items not for consumption (e.g. expenditure on direct tax, lottery purchase, and interest payment). Finally, household wealth, defined as total assets minus debts, is available from 2006 onwards. To make households of different sizes comparable, we adjust household incomes, consumption and wealth using the OECD scale and deflated it to 2000 prices throughout our analysis.[3]

We use the LFS in 2019 and 2020 as our supplementary data to study the implication of Covid-19 on labor market outcomes and inequality. The LFS is quarterly and nationally representative. For each sampling household, detailed information from all members is collected. This includes demographic characteristics, marital status, employment status, work hours, occupations and sectors. While the complete information on occupation is available for

[1] The waves are 1988-2009, and 2011, 2013, 2015, 2017, and 2019.

[2] SES collects income data by asking the amount of income by detailed sources for each item and it includes both monetary and in-kind income. Some items (e.g., wage and salary), are collected for each individual member whereas other items (e.g., profit from business, transfer income) are collected at household level. Our measure of total income is the sum of the amount of all itemized regular incomes but not unusual incomes (e.g. inheritances, prize winnings). The questions did not explicitly ask whether the income is before- or after- tax.

[3] The OECD household-equivalence scale is calculated by counting the first adult as one and each of the remaining adult as 0.5. All children are counted as 0.3.

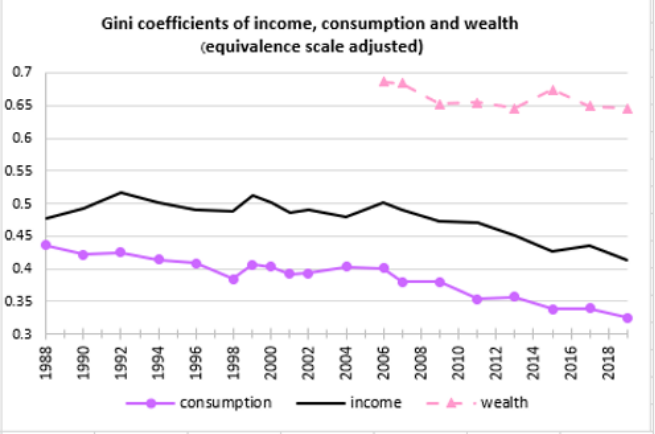
all types of workers (wage or salary workers, self-employed and unpaid workers), earnings data are collected only for wage or salary workers.

3. Trends of inequalities

3.1. Overall inequalities in the past three decades

We begin by documenting the trends of inequalities over time in income, consumption and wealth at the aggregate level. Figure 1 shows Gini coefficients of income, consumption and wealth from 1988 to 2020 using OECD equivalence scale where incomes are regular incomes, total consumption includes all consumption expenditure and wealth is total assets net of debts. Inequalities in these three dimensions have been declining over the past three decades.[4] This is in contrast with inequality trends in high-income countries such as the US and Canada (Brzozowski et al, 2010; Fisher et al, 2017).

Figure 1: Gini of income, consumption, and wealth



However, wealth inequality in Thailand remains substantially higher than income whereas consumption is the lowest among the three. The ordering of these three inequalities is unsurprising given that consumption could be smoothed by savings/borrowings, and hence exhibits less variation. On the other hand, wealth disparity is a result of income inequality compounded over lifetime and hence its variation is higher than that of incomes.

In Appendix A, we show that this declining trend is robust to other common measures of inequality, namely the ratio of the 90th to the 10th percentile (P90/P10), variance of logarithm of the interested variable, and the income share of the top quintile. In Sections 4 and 5, we will mainly use the P90/P10 and variance of logarithm because these two measures

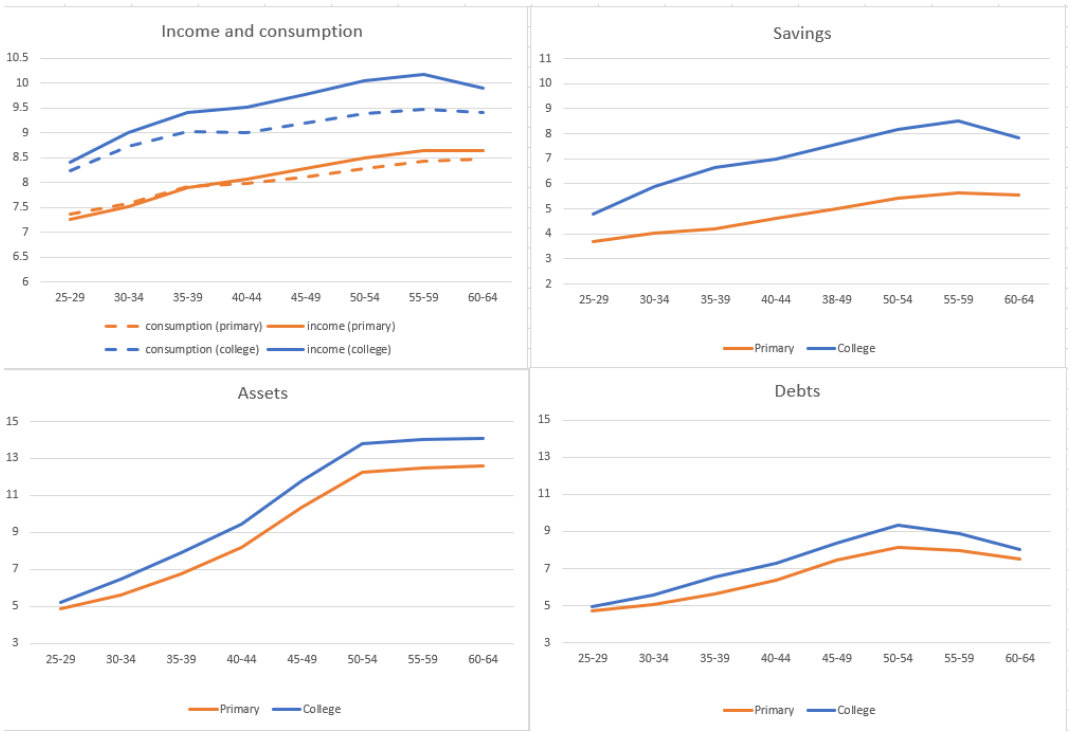
[4] SES, like typical household surveys in most countries, likely undersamples the top 1 percent of the wealth and income distribution. However, as discussed earlier even the study combining SES with tax and national income data still finds that income inequality declined between 2001 and 2016. In our simulation, to reverse the declining income inequality trend of the P90/P10 ratio, the bias from underestimation must increase over time, and that the 90th percentile of 2019 must be underestimated by at least 25% for the income inequality in 2019 to be the same as the 1988 level.

allow us to decompose the inequality to understand the changes in different parts of distribution or among subgroups of the population.

3.2. Overall inequalities along the life-cycle

Next we investigate how overall inequality of income, consumption, and asset accumulation evolve along the life-cycle. We do so by tracking the same birth cohorts (of household heads) over the SES's survey waves. In details, we group birth cohorts of household heads in five birth year groups, and document how their incomes, consumption, savings, total debts and total assets change as each birth cohort gets older over life-cycle. Figure 2 shows the life-cycle pattern of the 1955-59 cohorts among households whose heads have primary school education "primary household" and those with vocational or college education "college household".[5] On average, primary households have lower incomes and consumption than college households. The steeper profile of savings and assets among the college educated group implies a higher ability to accumulate their wealth than their lower educated peer. While the higher education group possesses higher assets, they also incurs more debts. This suggests that debts measured in SES are an indicator of financial access or higher borrowing limits rather than an indication of poverty. The net worth of the higher educated group is at a higher level for all ages (not presented). The gaps in the savings and total asset profiles have increasingly widen over their lifetime.

Figure 2: Life-cycle Inequalities by Education



[5] The income, consumption, and savings of the cohort born between 1955 and 1959 were observed between 1998 and 2019. Assets and debts, however, were collected since 2006, implying that we only observed assets and debts of the 1955-1959 cohorts only when they were 45 years old or older. To complete the life-cycle picture, we use the averages for those who were born between 1955 and 1979 for total assets and total debts.

Note: All variables are in the logarithmic form. Income, consumption and savings are of the cohort born between 1955 and 1959. Assets and debts are the averages of those who were born between 1955 and 1979.

These observations point to inter-linkages between income, consumption and wealth inequalities as well as how inequalities may vary by demographic. In the next section, we analyze income inequality by characteristics of households, and investigate to what extent structural changes in the Thai economy have contributed to income disparity over time.

4. The anatomy of income inequality

As discussed in section 2, the structure of the Thai economy and its demographic landscape have changed significantly along several dimensions - ranging from a declining role of the agricultural sector, expansion of educational opportunities, to aging population. In addition, public transfer programs in Thailand have become more expansive and generous over the years. In particular, the Thai government launched the elderly living allowance as a special scheme in 2009 to support those aged 60 years or over without any formal pension coverage.[6] In addition, Thailand's pension benefit program was introduced in 1998 under the Social Security Act for workers in the formal sector (excluding civil servants) and required at least 15 years of contribution. Therefore, the first cohort of SSO-pension claimants started in 2013. In this section, we analyze how these factors may have shaped the declining trend of income inequality over the past decades we have previously observed.

As discussed in section 2, household income and their income sources tend to change over the life-cycle. To separate changes over the life-cycle from over time, we first look at income components by three age groups based on the age of the household head – (i) prime-age group (heads aged 25-54), (ii) transitioning-age group (heads aged 55-69), and (iii) elderly group (heads ages 70 or above).[7] Note that for Thailand, the pension eligible age is 55 and the mandatory retirement age for civil servants and private sector is 60, but a large fraction of population over 60 remains active in the labor market, mostly in the informal sector. Thus, we consider the transitioning-age group to be the transition stage. Given that the healthy life expectancy in Thailand is 67 years (WHO, 2018), individuals in the transitioning-age group are, on average, physically able to continue participating in the labor markets.[8]

From SES, we group components of total household income into three sources: (i) transfers or pension payment; (ii) capital income, and (iii) earnings - including incomes from wage/salary, profits from self-employment or businesses, and payments received in-kind. Note that while a household head is defined based on the person with the highest income in the household, all income components are derived from all household members.

Figure 3 plots the temporal patterns of income from the three income sources by age group. For all age groups, the average real income (adjusted by equivalent scale) increased over time, except the stagnant period between 1998 and 2001 after the Asian Financial Crisis.

[6] The allowance was set at 500 Baht per month in 2009 when it was initiated. It covers individuals aged 60 and above who are not eligible for other public pension scheme. Currently in 2020, the allowance is 600, 700, 800 and 1000 bahts for the age brackets of 60-69, 70-79, 80-89 and 90 and above years old, respectively.

[7] We focus on households with heads aged at least 25 years old because the fraction of households with heads below 25 years old is very small.

[8] Most developed countries have a full pensionable age between 65 and 70 with the option to take their benefit as early as 62.

Earnings broadly account for a sizable portion of total income - especially for prime-age households. Transfers and pension account for a much larger share of total income among older households. Noticeably, the real-term value of transfers and pension has increased over time, especially during the recent decade.

Figure 3: Income composition by age groups from 1998-2019

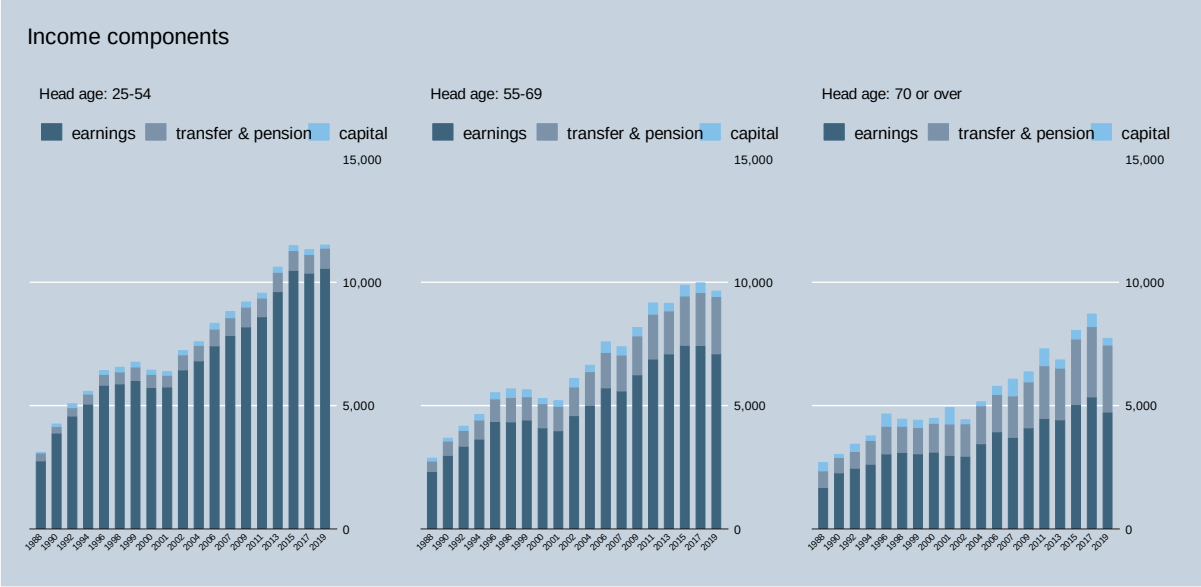
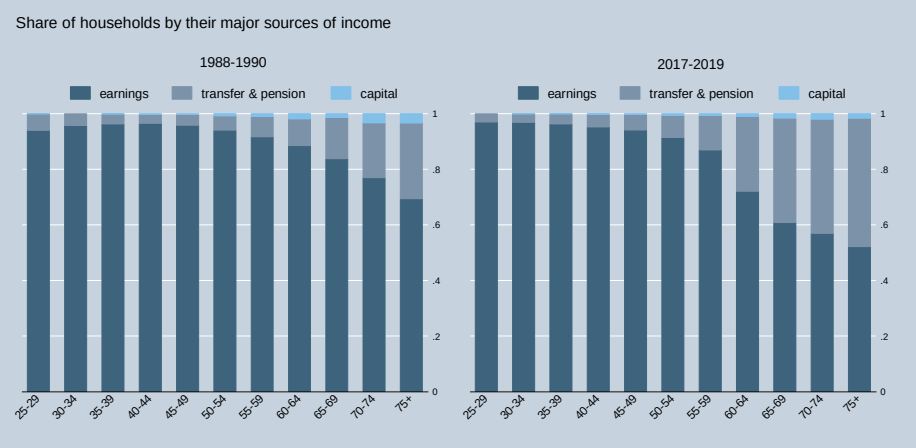


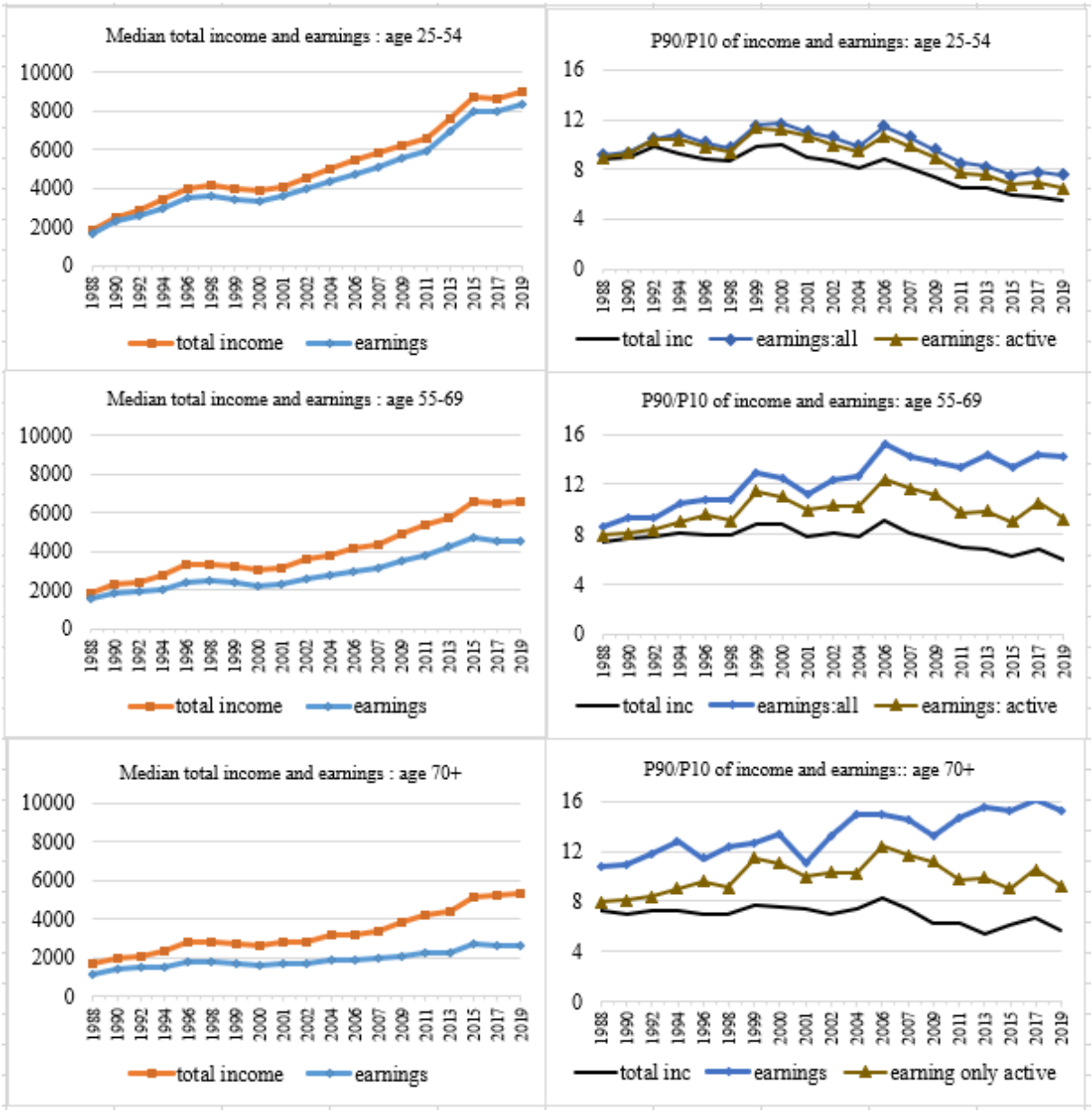
Figure 4: Shares of households by their major source of income 1988-1990 vs. 2017-2019



To gain insights on the role of income component across ages, we divide the household sample by 10-year age group, and classify their status according to their major source of income. More specifically, we assign types of households based on whether earnings, transfers/pension, or capital income is the largest component of their total income. Figure 4 compares income components by age-groups between the earliest SES waves (1988-1990, left panel) and the most recent waves (2017-2019, right panel). For all age-groups,

particularly those older than 55 years old, the fraction of households with transfers/pension as the main source of income has considerably increased between decades. Among households with head aged 55-59 years, this fraction has increased from 7% to 12%; and for those aged 60-64 years, the figure increased from 10% to 27%.

Figure 5 : Median and inequality of total income and earnings by age group



Next, we show that the inequality trends between total income and earnings differ across age-groups. Figure 5 plots median and the ratio of the 90th to the 10th percentile (P90/P10) of income and earnings within each age group. Consistent with Figures 3 and 4, the left panel of Figure 5 shows that the gap between median earnings and median total income increases in the age of household heads. For total income, the P90/P10 measure demonstrates a declining trend over time in all age groups (Figure 5, right panel, black

lines).[9] On the contrary, the P90/P10 of earnings reveals a more complicated pattern. At the right panels, we compare the temporal patterns of earnings inequalities among the full sample of households (blue line), and among the sub-sample of households actively participating in the labor market (green line).[10] Once we exclude the inactive households from the analysis, the trend of earning inequality among the transitioning-age and elderly groups only slightly increase. In contrast, the inclusion of inactive households in the analysis reveals that earnings variation among older households increases dramatically in the past three decades.

Note that both total income and earnings inequality among prime-age households (25-54) exhibit a declining trend during the same period. The opposing trends between total income and earning inequality among older households is highly suggestive that redistribution – through transfers and pension – plays a vital role in dampening the total income inequality among older households. We discuss this in detail in Section 4.1.

The increasing variation in earning among the transitioning-age households (whose head is in transition toward a full retirement) can be accounted for by two mechanisms. First, there exists a slight increase of earnings inequality (compared to the 1988 level) among transitioning-age households remaining active in the labor markets (the green line). Secondly, the widening gap between the blue and the green lines is indicative that over the years, there is an increase in the fraction of inactive households – who may experience earnings close to zero. On the one hand, the two mechanisms could imply that the transitioning-age households, in relation to the prime-age households, face more challenges in the labor market; namely, a larger earning uncertainty if continuing working and a declining job opportunity if losing their jobs. On the other hand, there could be a handful of transitioning-age households who leave the labor markets voluntarily if they have sufficiently accumulated wealth, or are able to substitute foregone earnings with pension income. We will discuss more about the earnings inequality among the prime-age and the transitioning-age group in Section 4.2.[11]

4.1 The role of transfers

As shown in Figure 4, transfers increase significantly among the households older than 55. In this section, we illustrate the role of transfers and pensions on income inequality within the three age groups, namely prime-age group (25-54), transitioning-age group (55-69), and elderly group (70+).

We first investigate the role of transfers by counterfactually omitting various sources of total incomes. Figure 6 plots the counterfactual P90/P10 ratio. As a reference, the black line shows the observed total income inequality (same as the right panels of Figure 5). When

[9] Using the standard variance decomposition of total income (in log) across the three age groups, we find that most of the total income inequality is explained by the variation within age groups. Thus, we will focus here more on the within age group inequality. However, it is worth noting that the inequality between age group continuously increases from 0.13% in 1988 to 4.6% in 2019.

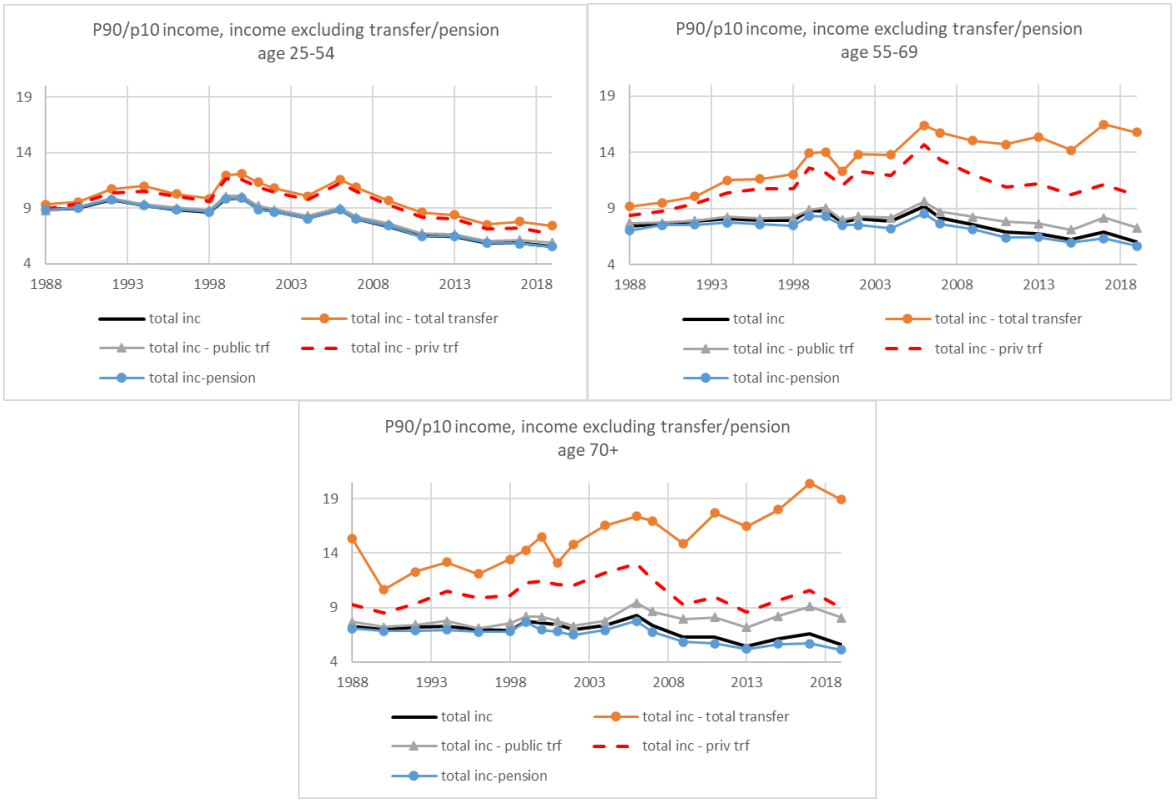
[10] Inactive household is defined as households which do not receive any earned income in cash.

[11] We do not attempt to analyze reasons underlying the trend of transitioning-age group becoming more inactive here as a panel data is required to understand such trend. Paweenawat et al. (2019) speculate that the shift from the informal to formal sector together with mandatory retirement at 55 or 60 can be the underlying forces.

public or private transfers/pension is omitted, the counterfactual ratios remain close to the benchmark for prime-aged households (top-left). In contrast, for older households, the counterfactual P90/10 ratios rise substantially (top-right and bottom) [12] - with the gap between the black and orange lines getting widened over time. This evidence confirms the increasing redistributive role of transfer income over these decades.

Moreover, we find that private transfers have the largest impact on reducing total income inequality for the transitioning-age and elderly households. As shown in the top-right and bottom panels of Figure 6, the exclusion of private transfers from total income considerably shift the counterfactual inequality measures up. However, such heavy reliance on informal private transfers from friends and extended families may not be sustainable given Thailand's on-going demographic transition with households having fewer children. Additionally, the pandemic may exacerbate the decline in private transfers if income losses from Covid-19 lead to a cut in remittances. We further investigate the consequences of Covid-19 on inequality in Section 6.

Figure 6: Counterfactual income inequality by source of incomes



Finally, the opposite roles between pension and other transfers on income inequality are noteworthy. While omitting transfers leads to an increase in inequality, leaving out pension leads to a slight decline in the income inequality among the transitioning-age and

[12] In the data, we cannot distinguish whether in-kind transfer is public or private, thus we split the amount equally and separately add it into the public and private transfers. The amount of in-kind transfer is relatively small (around 15% of all in-kind, and hence the way we split does not significantly change the picture).

elderly households. This observation reflects the regressive structure of Thailand's pension system. Specifically, most individuals who have access to adequate pension income already have high income from other sources (e.g. earnings, business income, or capital income). Figure B1 in the Appendix shows that most households with pension income are concentrated in the top 20 income quintile group. In contrast, those from the lower part of the income distribution have no access to formal pension pay-outs.

4.2 The earnings inequality among active households

To isolate the redistributive role of transfers and focus on the implications of structural changes on the labor markets, we focus on earnings among active households in this section. We have shown that among active households, earnings inequality of the prime-age group declined (Figure 5, top-right) while earnings inequality of the transitioning-age group slightly increased (Figure 5, middle-right). In what follow, we will discuss the underlying forces behind this observation by associating each household to their main labor market activities.

We classify labor market activities of active households into three groups: (i) farm only; (ii) non-farm only, and (iii) farm and other income sources (mixed), and present their shares in Table 2.[13] The bottom 20, middle 60 and top 20 are households with earnings in the 0-20th, 21st- 80th and 81st-100th percentiles, respectively.[14]

We find that among active households, the majority of households in the bottom 20 are related to farm activities. In contrast, those in the top 20 are related to non-farm activities. Among the middle 60, there has been a considerable shift from farm to non-farm activities over 30 years (+ 45 ppt for the prime-age group and +33 ppt for the transitioning-age group). The shift toward non-farming activities is likely driven by the change in economic structure toward manufacturing, trade and services and the rise in education level. The last column of Table 2 also confirms the increasing shares of inactive households among the transitioning-age group (55-69 years old), +11 ppt overall and + 26 ppt among the bottom 20th earning percentile.

Given the division between farming and non-farming households along the earnings distribution, we examine their earnings trends in Figure 7. As can be seen in the left panel, while the real median earnings increase over time for all types of households, median earnings of non-farming households are always higher than earnings of farming and mixed income households. Within the same household type, the prime-age households earn more than the transitioning-age. However, this could be driven by the fact that the younger households likely attain higher education level. The right panel shows the changes in shares from 1988 where the shift from farming to non-farming sector is more prominent among the prime-age group.

[13] Farm only households are households whose sources of cash income (from any member) is from profit from farm business and/or being employees in the agricultural sector. Non-farm households are those who have no farm income but receive cash profit from doing business or cash income from working in a non-agricultural sector. Mixed households are those who derive income from both sources.
[14] The percentiles are defined for each year among those aged 25-69, including inactive households.

Table 2: Household shares (%) by earnings and labor market activities

		Year	1988	1994	2000	2006	2013	2019	Difference 2019-1988
Age 25-54	All	Farm	32.84	25.38	25.14	20.29	21.3	15.63	-17
		Mixed	34.28	27.85	24.54	28.33	21.65	14.22	-20
		Non-farm	31.72	45.18	48.42	49.36	54.91	67.55	36
		Inactive	1.16	1.6	1.9	2.02	2.14	2.59	1
	Bottom 20	Farm	50.1	55.5	56.7	49.7	49.2	50.9	1
		Mixed	35.2	26.2	26.7	30.3	22.4	13.6	-22
		Non-farm	9.6	10.8	7.8	8.7	13.5	13.2	4
		Inactive	5.2	7.6	8.9	11.3	15.0	22.4	17
	Middle 60	Farm	35.5	24.5	24.5	18.4	20.5	14.8	-21
		Mixed	41.5	35.2	30.4	33.3	25.0	17.4	-24
		Non-farm	22.8	39.8	44.5	47.9	54.2	67.6	45
		Inactive	0.3	0.5	0.7	0.5	0.2	0.3	0
	Top 20	Farm	10.0	5.4	3.7	5.6	7.7	2.8	-7
		Mixed	13.6	9.5	7.4	13.5	12.2	6.6	-7
		Non-farm	76.3	85.1	88.8	81.0	80.0	90.4	14
		Inactive	0.1	0.0	0.1	0.0	0.0	0.2	0
Age 55-69	All	Farm	37.9	30.6	32.0	29.9	29.5	25.0	-13
		Mixed	33.3	29.8	24.1	27.4	24.4	17.8	-15
		Non-farm	23.2	31.3	32.9	31.8	33.7	40.9	18
		Inactive	5.6	8.3	11.0	11.0	12.5	16.3	11
	Bottom 20	Farm	47.3	43.6	43.6	45.5	42.2	38.5	-9
		Mixed	18.8	20.8	15.8	17.7	11.6	8.9	-10
		Non-farm	14.8	13.0	11.9	8.0	9.8	7.7	-7
		Inactive	19.1	22.6	28.7	28.9	36.4	45.0	26
	Middle 60	Farm	40.2	29.3	31.4	25.3	26.1	21.5	-19
		Mixed	40.2	36.8	30.6	35.5	32.6	24.4	-16
		Non-farm	17.8	30.8	33.7	35.7	39.9	51.0	33
		Inactive	1.8	3.1	4.4	3.5	1.4	3.1	1
	Top 20	Farm	15.4	7.2	8.9	11.9	13.4	5.7	-10
		Mixed	26.2	17.6	14.0	16.1	21.6	12.4	-14
		Non-farm	56.7	74.4	76.6	71.8	64.4	81.6	25
		Inactive	1.7	0.8	0.5	0.2	0.6	0.3	-1

Figure 7: Median earnings and accumulated changes in shares by labor market activities

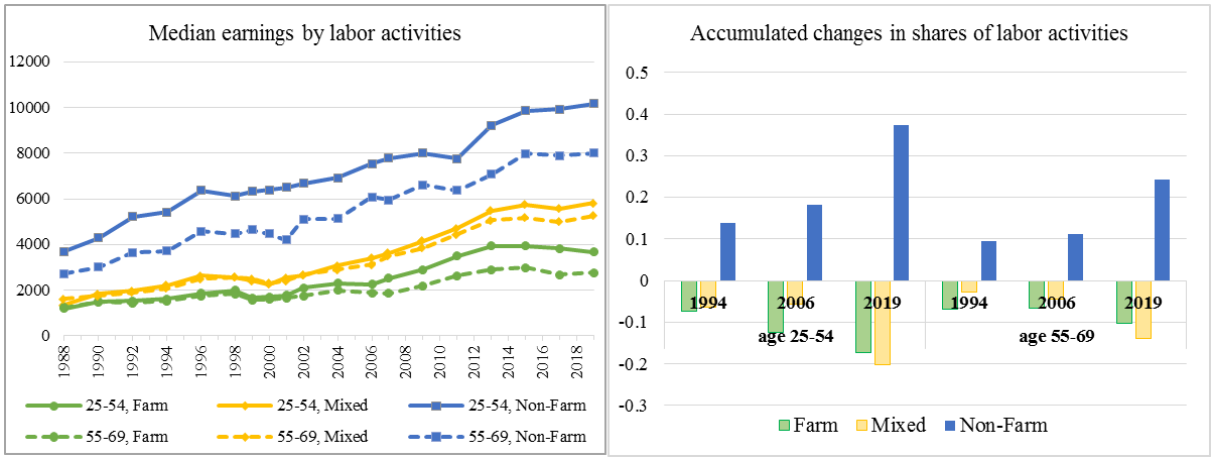
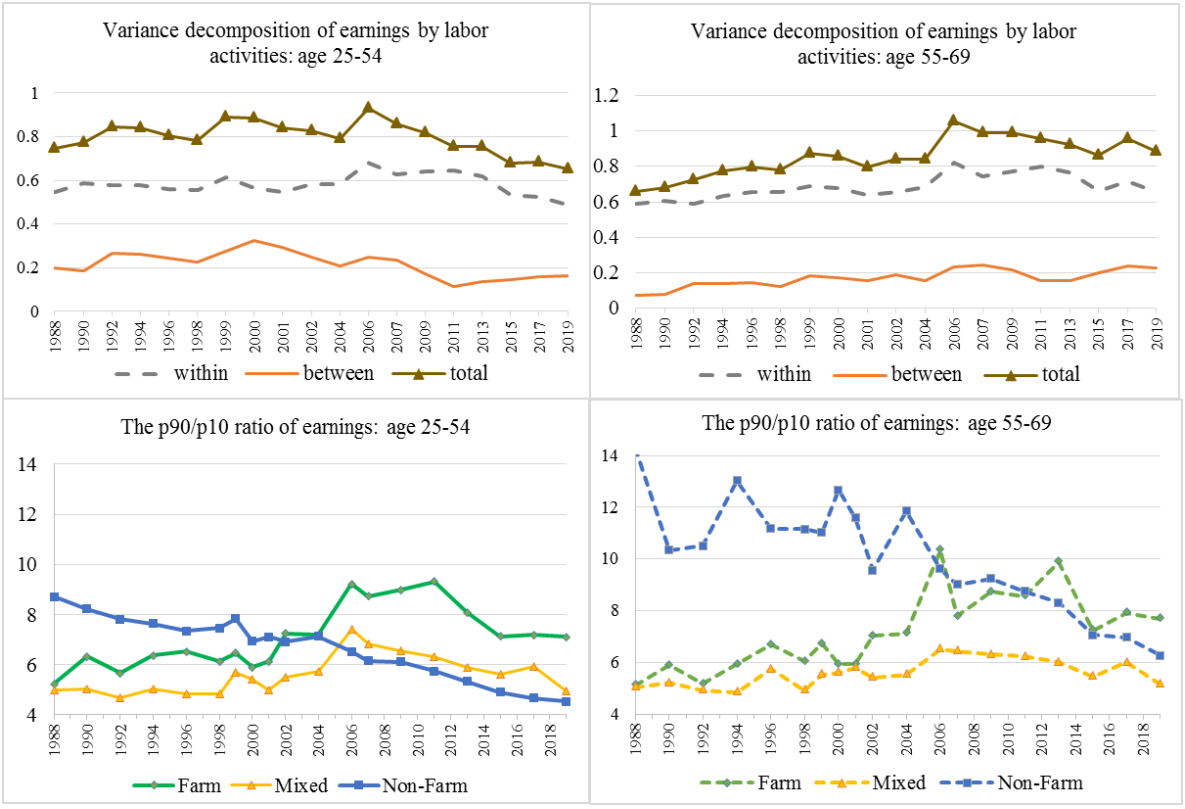


Figure 8 further shows the underlying forces of the earnings inequality. Using the standard variance decomposition of earning (in log), the top panel decomposes the earnings inequality (total) into the "within" and "between-group" components.[15] The brown lines are the same as the earnings inequality among active households in Figure 5. For both prime-age and transitioning-age groups, the "within" group components explain more variations in earnings (approximately 76% for prime-age and 80% for transitioning-age). The bottom panel presents the earnings inequality "within" each group. The opposite changes in the shape of earnings distributions of farming and of non-farming households are striking. For farming households, earnings inequality rises before 2004 and then relatively stable among both prime-age and transitioning-age groups. In contrast, among non-farming households, earnings inequality has been declining over the past three decades. The continuous rise of fraction of non-farming household and the decline of fraction of farming households among prime-age group has contributed to the reduction of overall earnings inequality. For the transitioning-age group, the earnings inequality has continued to rise because the composition change is not as sizeable (in 2019, the fraction of farming households among transitional age is 30%, compared to 16% of the prime-age group).

[15] The variance of log earnings in period t, $var(y_t)$, can be decomposed to $var(y_t) = \sum_p w_{pt}\big(E(y_t|p) - E(y_t)\big)^2 + \sum_p w_{pt}\left(y_{t,p} - E(y_t|p)\right)^2$ where p is an index for farm, non-farm, and mixed income groups. The first component is the weighted average for the difference between group mean and the overall mean, often called the "between" component. The second component is the weighted average of the variance within each group, often called the "within" component.

Figure 8: Variance decomposition and earnings inequality by labor market activities



While comprehensive analysis of what explain the dynamics of earnings inequality of each type of households is beyond the scope of this paper, we examine the roles of education on earnings inequality for farming, mixed, and non-farming households in Figures B2-B4, respectively. Using a standard variance decomposition, we can decompose (log) earnings into the "within-education group" and "between-education group" components.[16]

We summarize three key patterns here. First, for all types of households, the within-group variation explains most of the variation in earnings, especially for farming households. Specifically, the between-group component accounts only 1-4.5% of variation in farm earnings whereas the between-group component accounts for 8-13% and 14-24% for mixed and non-farming households, respectively.[17] Second, for farming households, the within-group variation increased since 2001 for both primary and middle school or higher groups, and only slightly declined in 2011.

In contrast, for non-farming households, while the within-group variation declined for primary or lower, middle school and high school groups, the within-group variation for vocational or college is relatively stable. There is no clear pattern of the within-education

[16] The between group variation is the variance of average earning by educational group, or the weighted average of deviation of group mean from grand mean.

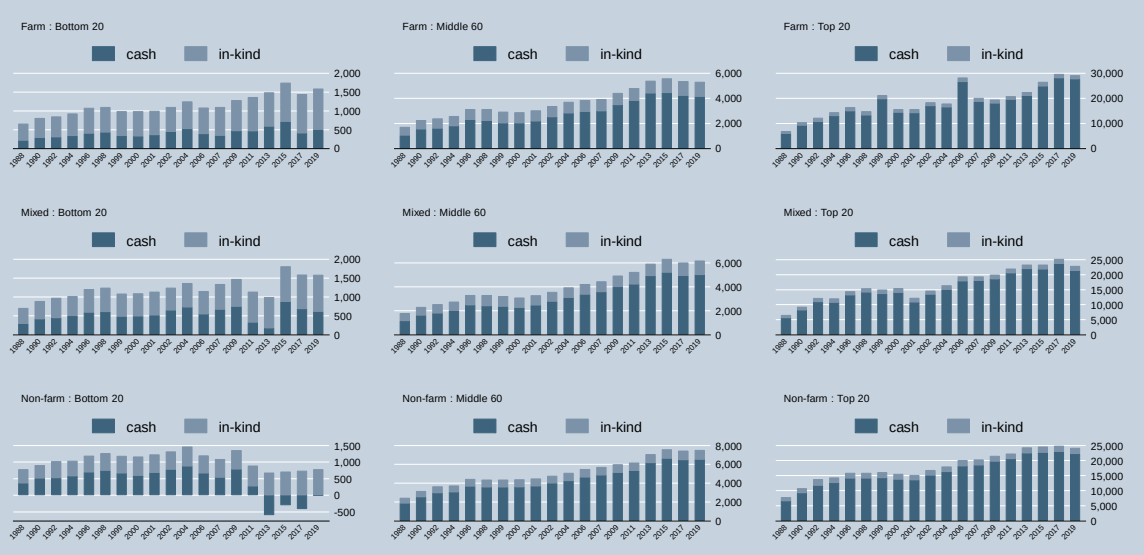
[17] Since most farming households are primary educated, we only separate farming households into "primary or lower" and "middle school or higher", and the fact that most of them are primary educated also lead to the small contribution of between-group component. For mixed and non-farming households, we use four groups of education (primary or lower, middle school, high school and vocational or college).

group variation for households with mixed sources of income. Third, with respect to the between-education group component, the earnings differences between the primary, middle and high school groups, have been compressed. This can be observed in both mixed and non-farming households; and for the prime-age and transitioning group.

The fact that the earnings inequality among farming households rose over time could be explained by several potential factors. For instances, produce prices, which affect farming revenue, can be highly fluctuated across regions and times. Higher frequencies and severity of climates could affect agricultural outputs. Another possible factor is the increasing divergence of technological utilisation and capital access among farming households. While there has been an increasing use of new technology, most of the Thai farmers are relatively old and their farming businesses are small. Lack of knowledge, financial constraints and limited utilisation of economy of scale are key barriers of technological adoption among many subsistent farming households (Attawanich et al., 2019).

The last observed pattern is consistent with what is already documented in Paweenawat et al (2019). Using the LFS, they find that earnings of high school educated have been relatively stagnant and wage dispersion (within inequality) among the lower educated groups gets more compressed over time. Paweenawat et al (2019) explains that it may be due to the changes in occupational composition within each education group. People from recent cohorts with middle and high school qualification likely take lower-skilled jobs, compared to older cohorts. This could be due to more abundant labor supply of workers with similar skills. The fact that low-skilled jobs tend to have lower wage dispersion leads to more compressed earnings distribution among non-college groups. We leave the investigation whether the same explanation still holds for household-level earnings for future research.

Figure 9: Fraction of cash and in-kind earnings



Above all, it is worth noting that farming households not only have lower and more volatile earnings, they also face more limited financial liquidity. Compared to households with common levels of earnings, farming households are more likely to receive a part of earnings

as in-kind (e.g. foods and housing) - especially for those in the bottom 20 percent of the earnings distribution (see Figure 9).

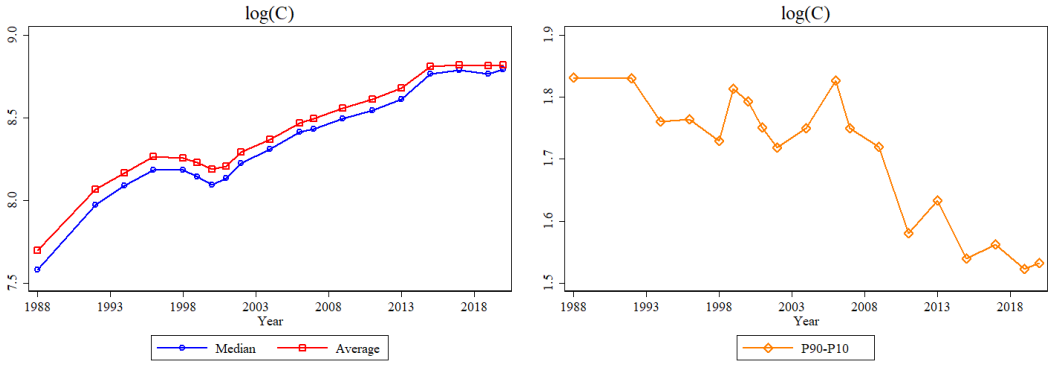
5. Consumption

In this section, we first analyse how inequality of households' total consumption has evolved overtime, in relation to the pattern of income inequality observed in the Section 4. To better understand the potential implication of households' consumption on other forms of inequality, we examine the composition of household spending. Finally, we discuss how these differential spending compositions may affect households' ability to cushion themselves against negative shocks - particularly during the covid-19 pandemic.

5.1 Has consumption inequality mirrored income inequality?

In line with the overall decreasing trend of income inequality and rising average income over the past 30 years, inequality in households' total consumption including all types of expenditure has steadily declined and the average has risen (see Figure 10). The compression is more pronounced at the upper-half of the consumption distribution as indicated by the declining trend of P90-P50 relative to P50-P10 over time.

Figure 10: Aggregate consumption (1988-2020)



Notes: consumption includes all expenditure items, expressed in OCED equivalence scale and in logs.

As discussed in the previous section, while income inequality at the aggregate level has fallen overtime, we observed heterogeneity in many aspects. This includes (i) the within inequality of incomes of prime-age, transitioning-age and elderly households have fallen and (ii) both between and within inequality of incomes across education levels of household heads have decreased. The left panels of Figures 11-12 plot the differences of average log of total consumption from the mean by age of household heads and by their education attainment, respectively. The right panels of these figures show the corresponding P90-P10 of log of total consumption. Overall, consumption inequality has mirrored the changes in income inequality both within and between along age groups and education levels quite well.

Figure 11: Consumption inequality by age groups

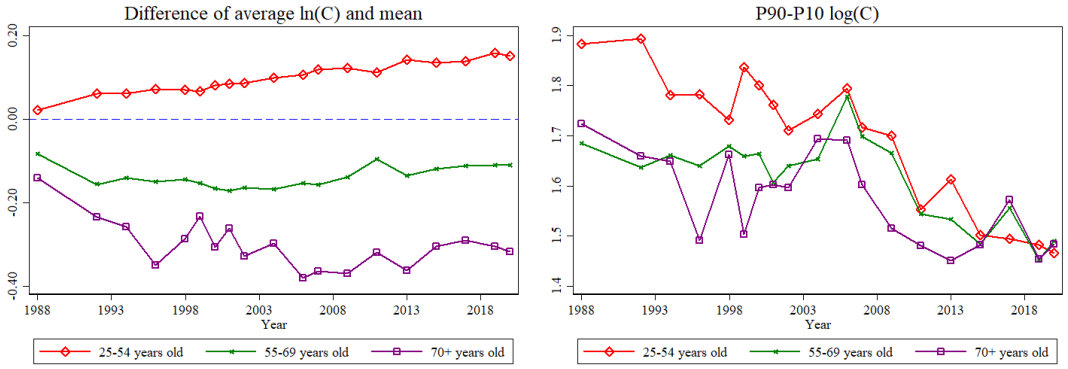
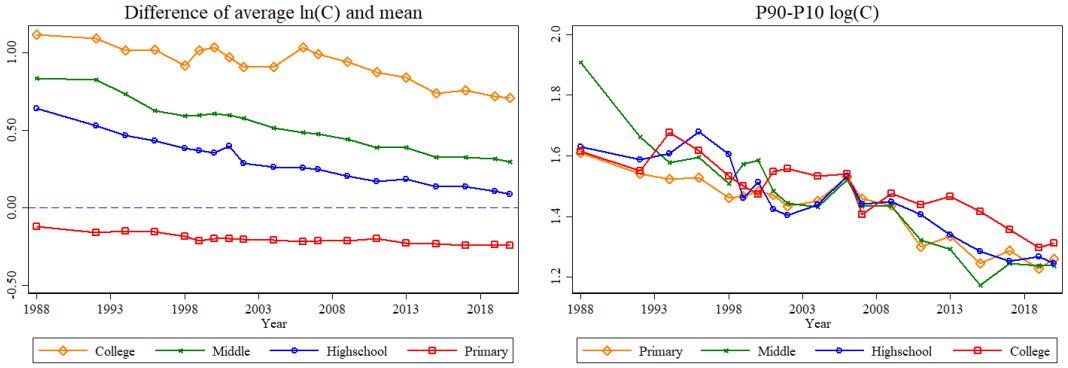


Figure 12 Consumption inequality by education level



5.2 Expenditure composition and household's ability to smooth consumption

Income, consumption and savings inequalities have an intertwined relationship. If low-income households allocate most of their incomes on essential, necessary items, such as foods and housing, this implies that their ability to adjust consumption is limited. Thus, they can be more exposed to negative income shocks. In response to an unanticipated negative income shock, households with limited consumption adjustment may need to deplete savings or borrow in order to finance their essential spending. Further, a reduction in certain types of expenditure such as education or health spending may have long-term implications on intergenerational inequality.

Table 3 shows the average total expenditure and the average spending shares by households' characteristics in 2019. While households from the bottom 20% of the income distribution spend proportionately more on essential goods such as foods and housing, they spend less on education compared to the middle 60% or top 20% of the income distribution. Households with older heads maintain a higher fraction of spending on foods and housing. Unsurprisingly, they spend a smaller fraction on education than what prime-age households do. The older households' higher share of essential spending coupled with their tendency to

rely on transfers make them vulnerable to adverse shocks -- both shocks to themselves and shocks to their transfer income providers. Additionally, households with heads of primary education or those with only incomes from farming spend more proportionately on essential goods and less on education - and at the same time earn lower incomes - than their counterparts. Overall, households with lower incomes whether by age, education or income sources are likely to spend more proportionately on essential goods making it difficult to adjust consumption in face of any income reduction.

Table 3: Composition of spending in 2019

		Composition of Spending in 2019									
		Total	Food	Housing	Health	Educ	Vehicle	Lockdown	Telecom	Remittance	Others
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Income	Bottom 20%	3,833	50.0	23.6	1.0	0.7	7.1	1.3	2.6	0.5	13.3
	Middle 60%	6,895	41.1	21.2	1.0	1.0	11.2	2.2	3.7	3.4	15.0
	Top 20%	16,269	27.0	19.0	1.4	1.4	17.5	4.1	3.8	7.5	18.2
Age	25-54	9,371	38.2	18.6	0.8	1.1	13.3	2.6	3.8	5.8	15.7
	55-69	7,331	41.3	23.1	1.3	0.8	10.9	2.3	3.2	1.8	15.3
	70+	5,980	44.0	25.8	1.8	0.6	7.8	1.9	2.6	1.3	14.1
Educ.	Primary	6,046	43.9	22.0	1.1	0.7	10.0	2.0	3.1	2.5	14.5
	Middle school	8,480	39.0	19.5	0.9	1.0	13.1	2.5	4.0	4.6	15.5
	High school	10,460	35.3	19.9	0.9	1.3	13.9	2.9	4.1	5.3	16.3
	Vocational or college	15,825	27.7	20.6	1.3	2.3	15.8	3.8	4.0	6.5	18.0
Activity	Farm	5,303	45.6	21.4	1.0	0.7	10.5	1.8	2.9	1.6	14.5
	Mixed	6,560	41.7	16.9	1.1	0.9	15.0	2.1	3.5	2.1	16.6
	Nonfarm	10,133	36.7	19.9	1.0	1.1	13.0	2.9	4.0	5.6	15.9
	Inactive	6,288	43.8	30.8	1.7	1.2	4.9	1.9	2.3	0.6	12.7

Notes: Housing includes utility, rents, and repair expenses. Lockdown spending includes activities not available or suspended during the lockdown such as personal services, travel, and recreational activities.

Further, differences in spending composition can alter households' ability to absorb shocks during the pandemic. By April 2020, Thailand's lockdown restrictions had temporarily suspended certain activities to take place – mainly those that require close physical contacts and travelling. Therefore, without the supply of related goods and services, household spending on personal services, recreational activities, and travel were inevitably reduced. In general, high income households consume a higher fraction on such spending items (see Columns 6 and 7 in Table 2) Therefore, as a consequence of the lockdown's activity and travelling suspension, higher income households have more room to adjust their spending adjustment and may not need to reduce remittances in face of negative income shocks. With higher risk of income losses among the bottom household on the one hand, and

the unexpected surplus of income among the high income on the other hand, the presence of the pandemic may exacerbate existing inequalities. Further, Table 3 also reveals that higher income households also spend more on telecommunication. This implies that they are better equipped with remote working arrangement which was necessary during the lockdown.

6. Forthcoming impacts of Covid-19 on inequalities

In this section, we investigate the impact of Covid-19 on existing inequalities using the LFS. First, we examine how the pandemic has affected employment of workers by their demographic and sectors. Second, we provide evidence that the pandemic has led to rising earnings inequality. We supplement the analysis on spending effects using the SES. The adverse earnings effects are associated with a reduction in private transfers leading to spillover of the pandemic effects on others not directly affected.

6.1 Employment Effects

We first examine the pandemic effects on employment status and weekly work hours.[18] The first panel of Table 4 reports the labor force size and employment rates in the 1st and 2nd quarters of 2019 and 2020 using the LFS. The labor force size slightly declined in the 2nd quarter of 2020 and the employment rate decreased by 0.93 percentage point between the 1st and 2nd quarters of 2020. The change in employment rates between 2019 and 2020 reflects potential impacts of the pandemic, in combination with other macroeconomic factors. To quantify the pandemic effect, we perform a differences-in-differences (DID) analysis by assuming that the change in outcome in quarter 1 between 2019 and 2020 is a result of the macro-economic trend that may have driven the Year-on-Year (YoY) changes without the full impact of the Covid-19 pandemic. This allows us to isolate additional increase in unemployment resulted from other factors prior to the end of March 2020 when the government imposed lockdown restrictions to curb the spread of Covid-19. Hence the pandemic effect (DID estimate) is

$$Q_p = \left(Q_{2020,Q2} - Q_{2019,Q2}\right) - \left(Q_{2020,Q1} - Q_{2019,Q1}\right).$$

The last column of top panel in Table 4 shows the change in employment rate as a result of the pandemic, 0.87 percent. The effects on the extensive margin appears to be small.

However, a sizable fraction of workers was employed with zero hours in the 2nd quarter of 2020. As shown in the second panel, there were 1-2 percent of employed workers with zero hours prior the pandemic, but this figure increased to almost seven percent during the pandemic. Previously, these tend to be seasonal workers in agriculture in Northeast. In the 2nd quarter of 2020, employed workers with zero hours are mainly in areas and sectors which were heavily affected by the lockdown restrictions such as sales and services in Bangkok. The last column of the second panel shows that the pandemic has led 5.4 percent of workers

[18] Employment status is defined based on whether the respondent was working last week at the time of the survey.

to be employed with zero hour. We refer to these 5.4 percent of workers in the 2nd quarter of 2020 as "lockdown workers".

Additionally, the last two rows of Table 4 show the average weekly work hours with and without lockdown workers. With the extreme hour effect on lockdown workers, the average work hours falls by 4.3 hours per week due to the pandemic. Focusing on workers who have positive hours, the average work hours falls by 2 hours per week.

Overall, at the extensive margin of labour market effect, we observe minimal effect. In contrast, we observe a much larger adjustment on weekly work hours. During the pandemic, while some groups of workers may be able to retain their jobs, their hours have reduced substantially. And almost 2 million workers experienced a complete reduction of hours to zero during the pandemic. We note that these are short run effects. The effects may be amplified if lockdown workers eventually lose their jobs.

Table 4: Labor market impact

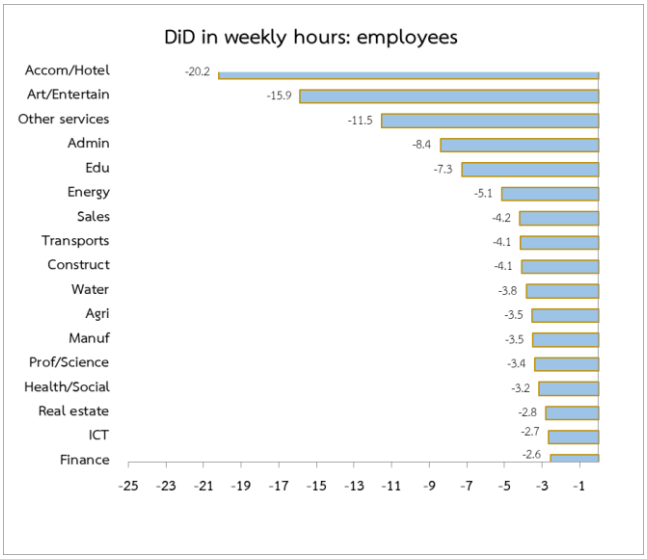
	2019q1	**2019q2**	**2020q1**	**2020q2**	**DID**
In labor force:	37,795,296	37,891,141	37,559,172	37,548,286	-106,731
Employment No.	37,444,158	37,514,203	37,165,400	36,803,120	-432,325
	99.07%	99.01%	98.95%	98.02%	-0.87%
Employed with zero hours	551,543	428,066	649,137	2,509,266	1,983,606
	1.47%	1.14%	1.75%	6.82%	5.40%
Average weekly hours (hours≥0)	40.9	42.7	40.4	37.9	-4.3
Average weekly hours (hours>0)	41.5	43.2	41.1	40.6	-2.1

Notes: sample includes all individuals aged 15-54 in the Thai LFS.

As discussed in Lekfuangfu et al. (2020), workers may be affected by the pandemic differently depending on their work characteristics. Workers employed in sectors requiring close physical contact at the workplace may be more exposed to infection and transmission risk, and workers whose jobs are not amendable to work remotely may have a higher risk of income loss due to drastic measures (e.g. sectoral lockdowns and social distancing). We first examine to what extent workers in different sectors are affected. Figure 13 plots differences-in-differences in work hours of employees and Figure 14 plots the equivalent statistics for self-employed workers.

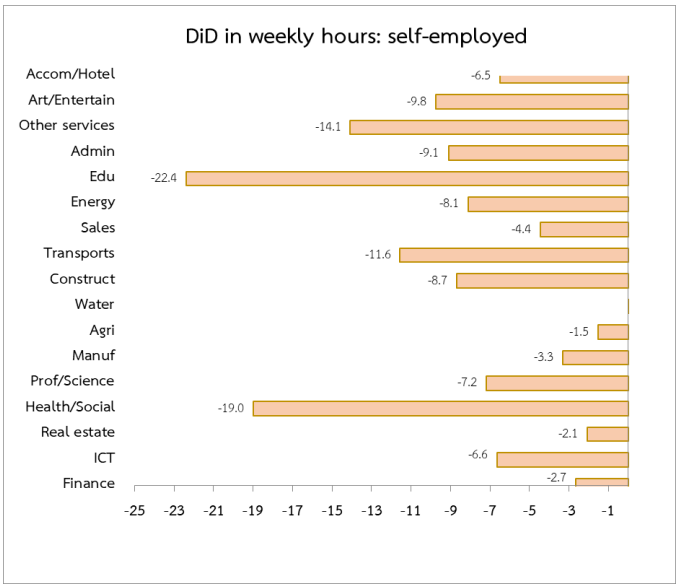
The negative hour effects of employees are highly concentrated in sectors such as arts/entertainment and accommodation which were more affected by lockdown measures. These tend to be sectors with a high degree of physical proximity at the workplace. The reduction in average work hours in these sectors were more than 10-20 hours per week. On the other hand, hours in sectors such as ICT and finance where jobs are more amendable to work from home and require less physical proximity are barely affected.

Figure 13: DID estimates of average work hours of employees



Notes: sample includes all individuals aged 15-54 in the Thai LFS.
Controls include regions, occupations, age groups and education levels.

Figure 14 DID estimates of average work hours of self-employed workers



Notes: sample includes all individuals aged 15-54 in the Thai LFS.
Controls include regions, occupations, age groups and education levels.

The negative hour effects on self-employed workers shown in Figure 14 are quite different from those on employees. The most affected sector in this case is education and health/social. These are likely to be owners of private tutoring centres or beauty clinics.

Sectors such as ICT and finance remain little affected for both employees and self-employed.[19]

Table 5 reports the hour effects by education level. Employees with middle education level are most affected, but the difference of the impacts is not sizable. Workers experience a reduction of 3-6 work hours per week. The effects on earnings, however, may not be uniform. To investigate this, we estimate differences in differences of log earnings of employees whom we have wage information in the Thai LFS. This accounts for about fifty percent of the labor force. Wage information of self-employed workers are not available.

Table 6 shows the earnings effects by education level, whether the workers are paid on a monthly or daily/weekly basis and whether they have positive work hours. Lockdown or zero-hour workers who have monthly salary experienced around 6-7 percent cut on their earnings regardless of their education level. The adverse earnings effects on lockdown workers who have non-monthly pay decrease in their education level ranging from a 8.9 percent reduction for primary educated to a 1.6 percent reduction for vocational/college workers. On the other hand, workers who remain having positive work hours are minimally affected except for those with primary education and non-monthly pay. This group experienced a 6 percent cut in their earnings. This contrasts with vocational/college workers who experienced a small increase in their earnings.

Table 5: Hour effects by education level

	Employee		Self-employed	
	est	std err.	est	std err.
Primary	-4.98	0.01	-2.92	0.01
Middle	-6.25	0.01	-4.34	0.02
Highschool	-4.60	0.01	-4.84	0.02
VC/college	-4.16	0.01	-5.55	0.02

Notes: sample includes all individuals aged 15-54 in the Thai LFS.
Controls include regions, occupations, age groups and industries.

Table 6: Earnings effects by education level and pay status

	Salary of zero hours				Salary of positive hours			
	Monthly paid		Non-monthly paid		Monthly paid		Non-monthly paid	
	est	std err.	est	std err.	est	std err.	est	std err.
Primary	-0.068	0.002	-0.089	0.003	-0.007	0.000	-0.060	0.001
Middle	-0.067	0.002	-0.037	0.003	-0.005	0.000	-0.008	0.001
Highschool	-0.061	0.002	-0.051	0.003	0.000	0.001	-0.023	0.000
VC/college	-0.061	0.003	-0.016	0.003	0.001	0.002	0.012	0.000

Notes: sample includes employees aged 15-54 in the Thai LFS.
Controls include regions, occupations, age groups and industries.

[19] In these sectors, jobs can be more easily performed remotely emphasizing the importance of work-location flexibility discussed in Lekfuangfu et al. (2020).

6.2 Widening inequalities

The concentration of negative earnings effects hours on low educated workers in the previous section implies that the pandemic could lead to widening earnings inequality. Table 7 shows the average, variance as well as the difference between various percentiles along the log monthly salary distribution. As can be seen, the earnings distribution has become much more unequal in the second quarter of 2020 while this figure is roughly the same prior the pandemic. We note that this is largely a contribution of changes in the earnings of lockdown workers.

Table 7: Earnings inequality pre-pandemic and mid-pademic

Year	Quarter	Mean	Variance	P90-10	P90-50	P50-10
2019	1	8.87	0.07	0.47	0.22	0.25
	2	8.88	0.06	0.39	0.22	0.17
2020	1	8.88	0.07	0.47	0.22	0.25
	2	8.86	0.21	0.49	0.24	0.26

Notes: sample includes only employees aged 15-54 in the Thai LFS. Earnings in logs and nominal.

In addition to rising earnings inequality, high-income households are more likely to make greater adjustment on their spending during the pandemic as they have a higher share of non-essential spending than low-income households. We illustrate this point in Table 8 which displays differences in differences of total and different types of expenditure, expressed in real term and OECD equivalence scale, using data in the first and second quarter of 2020 from the SES. Since the SES which does not provide income information in 2020, we tabulate expenditure by education levels of household heads. As shows in sections 3 and 4, these characteristics are highly correlated with incomes and savings. Households whose heads have college education tend to have higher incomes and savings than other education levels.

The first column shows that the average expenditure of households whose heads have college education decreased more than the expenditure of those who have lower education. The larger decrease comes partly from a greater reduction in expenditure related to vehicle and lockdown suspended activities in columns 6 and 7. These activities include travelling, entertainment such as trips to amusement parks and personal services such as haircut. Expenditure on foods and housing also fall more for college households than other groups. This is likely because food expenditure of the college group includes dining out which was not available during the peak of the pandemic.

Finally, the adverse earnings effects could be transmitted to others not directly affected. As shown in column 10, households whose heads have primary and middle education, on average, reduced their remittances. In effect, the pandemic impact of one household may spill over into other households through a reduction in private transfers.

Table 8: Spending composition before and after the pandemic

		Diff-Diff									
		Total	Food	Housing	Health	Educ.	Vehicle	Recreation	Telecom	Remittance	Others
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Education	Primary	-182	-130	9	9	10	-4	-18	8	-43	-22
	Middle	-107	-35	52	29	-8	-82	28	18	-133	23
	Highschool	-309	-284	83	75	-56	-117	-66	3	58	-5
	VC/College	-2120	-638	-663	44	-201	-226	-190	-29	27	-245

Notes: Expenditure in real term using OECD equivalence scale from SES 2020 quarter 1and 2.

7. Conclusion and Discussion

Inequality is a pressing policy concern which has attracted a lot of public attention in many countries. This paper shows that while total income and consumption inequality in Thailand has been declining over the past decades, the reasons behind the declining trends raise four concerns.

First, among the older households, the decline in income inequality is largely driven by the increasing redistributive role of private transfer and government assistance over the years. However, given the trend of households having fewer children, this channel of additional income may be unsustainable. This points to restructuring the labor market and retirement income policies so that the older households can rely on themselves.

On the labor market side, work opportunities for older workers in Thailand are presently limited. Most common retirement age in the Thai formal sector is still between 55 and 60. Many job advertisements still limit the age of applicants not over 35 years old. The policymakers need to encourage employers to evaluate workers based on their ability and skills, not their age. Also, employers should be allowed to renegotiate a contract with older workers so that their wages match their productivity. On retirement income policies, either using pension, providence funds or matched savings schemes, we need to make sure that (i) the schemes are inclusive; (ii) retirement income is sufficient; (iii) the schemes do not create disincentive to work; and (iv) the schemes are fiscal sustainable.

Second, among households being active in the labor markets, the earnings inequality among farming households has increased, but the declining share of the farm sector makes the rising trend undetected at the aggregate level. Among the non-farm households, although earnings inequality declined, the decline is driven by both the compressed distributions for those within the same education group and the smaller differences between groups. In particular, the earnings growths of those with middle and high school education have been slow. All implies that for both farming and non-farming sectors, there is still needs to improve labor productivity. While various policies to support small businesses, such as smart-farming and village funds, have been introduced, the lack of liquidity, economy of scale and knowledge may have prevented household from fully reaping the benefits of these programs (Kabowski and Townsend, 2011; Attavanich et al., 2019).

Third, while consumption inequality has fallen similarly to income inequality, the high share of essential spending among low-income households make them less able to adjust

consumption in response to negative income shocks. Further, at the eve of the covid-19 crisis, high-income households also spend more on telecommunication. This implies that high-income households could be more equipped to work remotely reducing their exposure to income losses from lockdown restrictions.

Finally, the vulnerability of the poor is more visible during the pandemic. In the short-run, we have already witnessed job and work hour losses. Even though the average work hours reduced for all education groups, earnings losses are higher among the lower educated group. This could be due to different pay-structure between the low-skilled and high-skilled jobs. In the long-run, while some of these temporarily unemployed could return to work, some may be permanently unemployed as their jobs are replaced by robots (e.g., cleaning at hospitals) or the reduction in in-person meetings (e.g., airline services, taxi drivers, services around workplace). Therefore, the effect of the pandemic on inequality may still be unfolding.

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Appendices

Appendix A: Robustness of inequalities

Figure A1 plots the Gini coefficients of income using different scales and measures. The green line is the official statistics reported by NESDC using household income per capita. SES has both aggregate household income and itemized incomes by sources available. The purple line is our calculated Gini coefficients of income per capital using the sum of itemized incomes. If we use the aggregate household income variable, the line would be almost exact as the official statistics. The black line is the household income equivalence scale adjusted used in our article. The equivalence scale adjusted gives a slightly lower level of the inequality estimate because low income households tend to have more children. Over all, the three measures give consistent trends of the declining income inequalities over the past three decades.

Figure A1: Gini coefficients of income using per capita vs. OECD scale adjustment

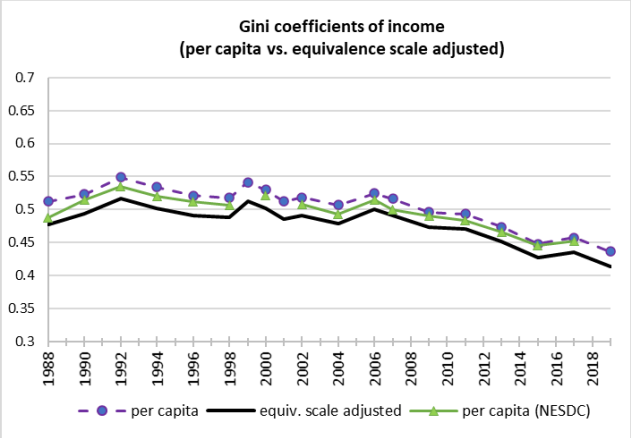
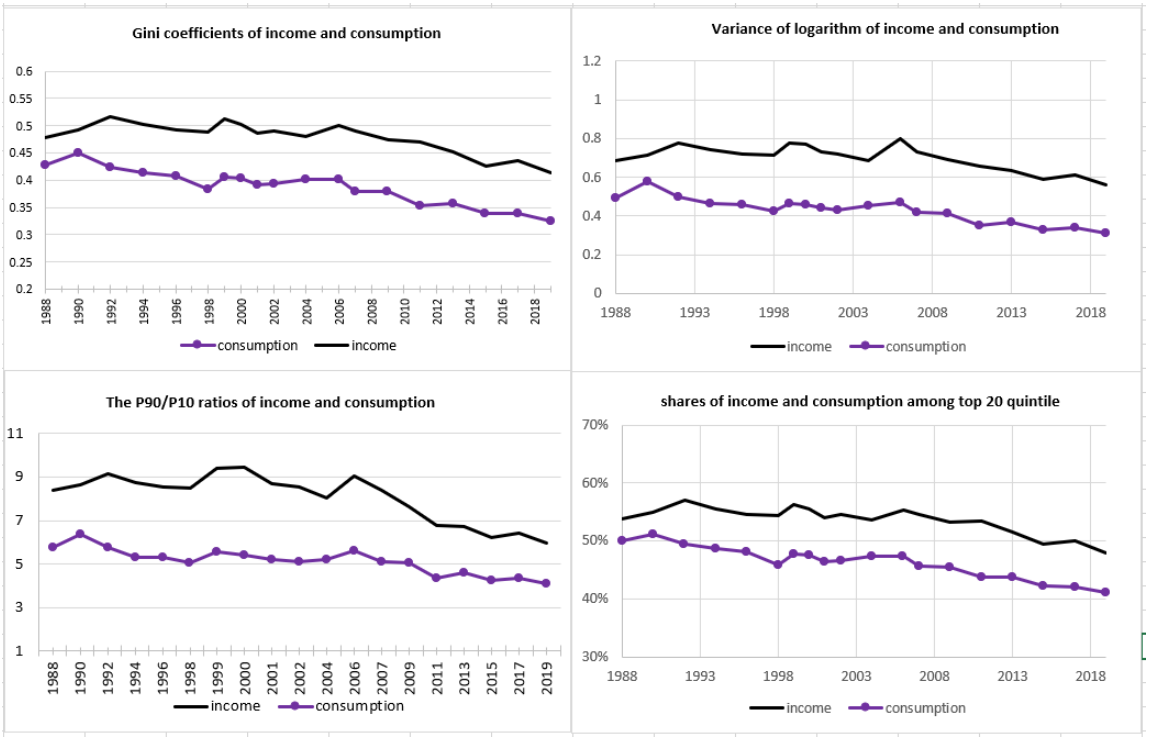


Figure A2 presents various inequality measures of total income and consumption (all equivalence scale adjusted). The top-right uses Gini coefficients, the top-left uses variance of logarithm, the bottom-right uses the P90/P10 percentile ratios, and the bottom-right uses the share of income among the top quintile (top 20%) from the aggregate total income from all households. All measures show the declining trends of both income and consumption.

Figure A2: Various inequality measures of income and consumption



Appendix B: Supplementary figures

Figure B1: Transfer and pension income components among households age 55 or over

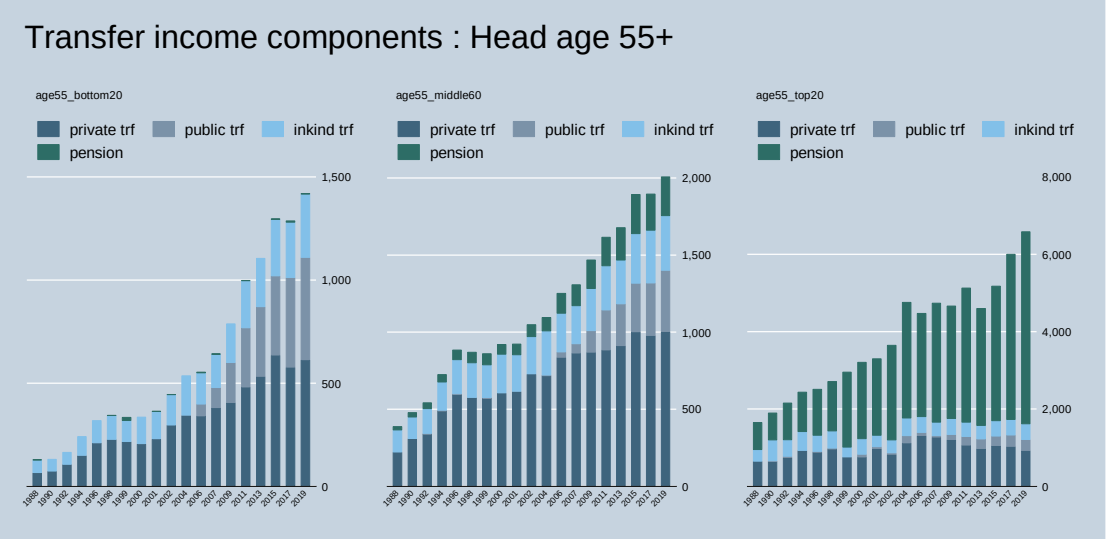
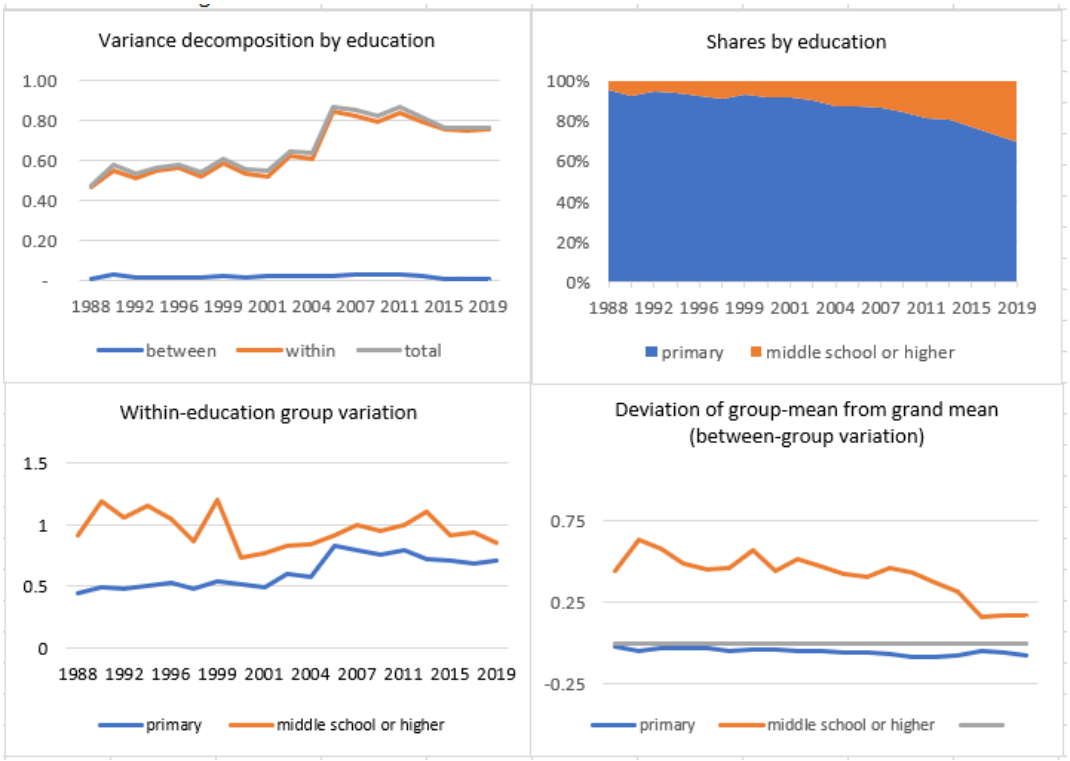


Figure B2: Decomposing earnings inequality among farm households by education

Farming households: head age 25-54 years old



Farming households: head age 55-69 years old

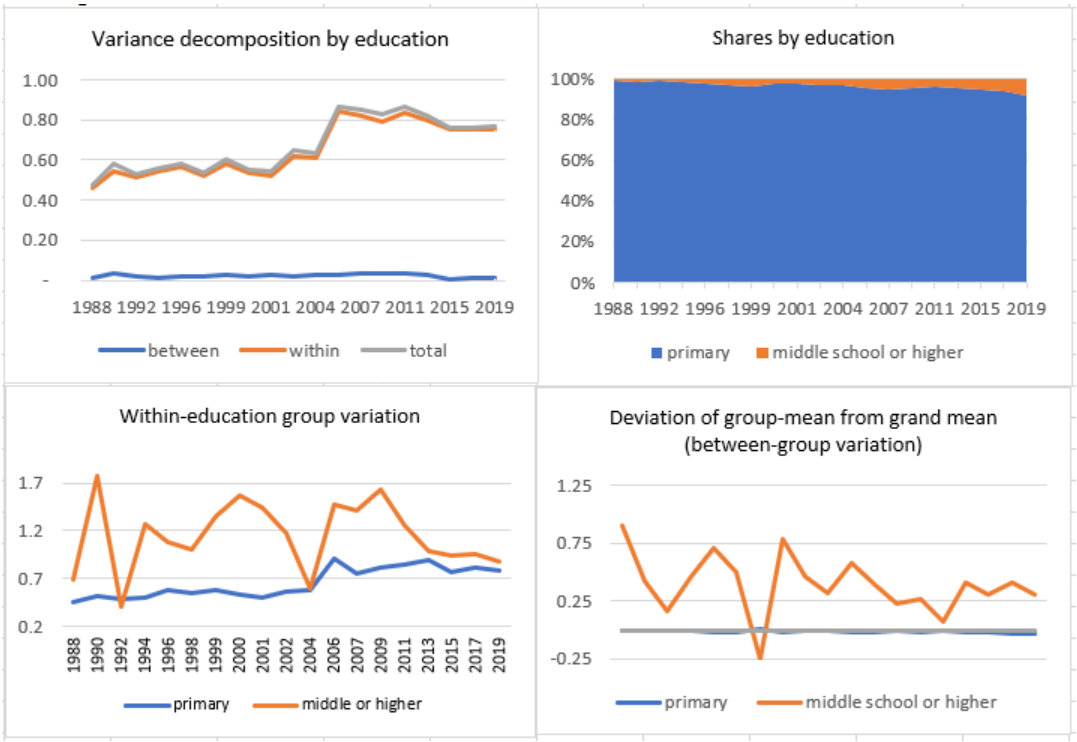
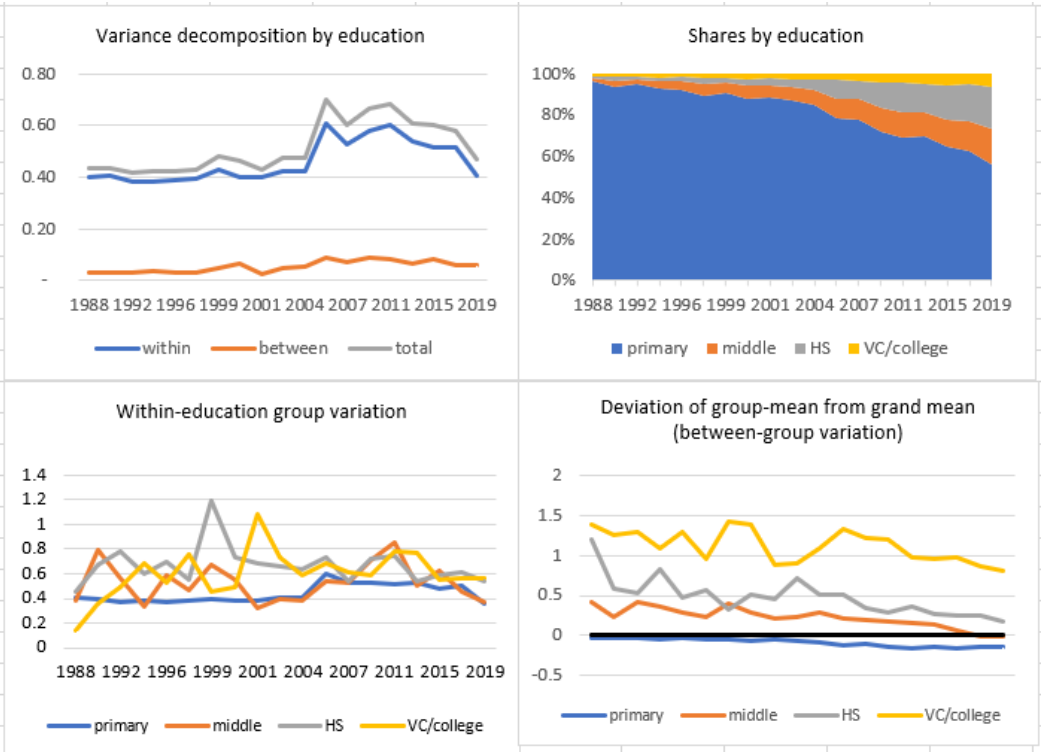


Figure B3: Decomposing earnings inequality among mixed households by education

Mixed households: head age 25-54 years old



Mixed households: head age 55-69 years old

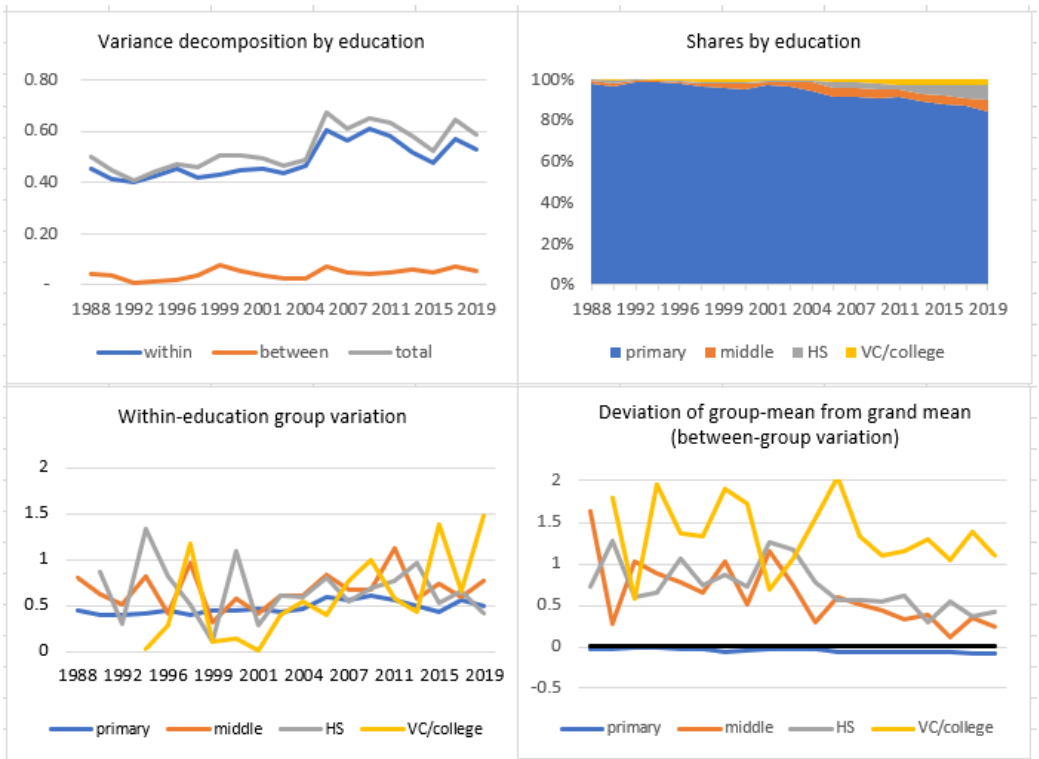
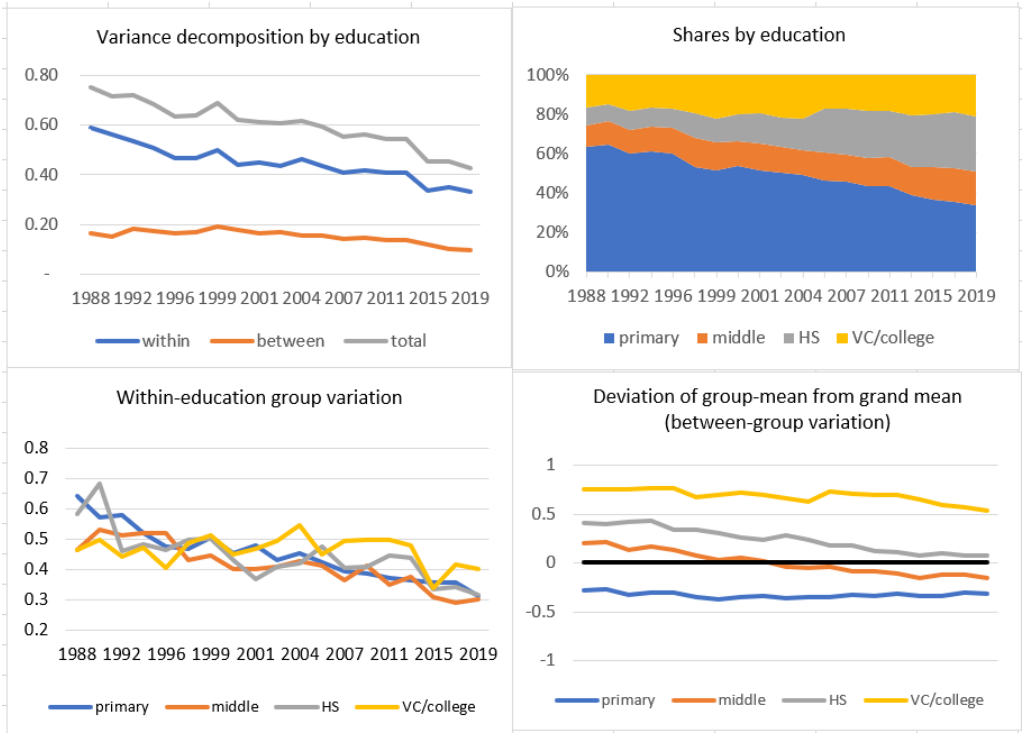
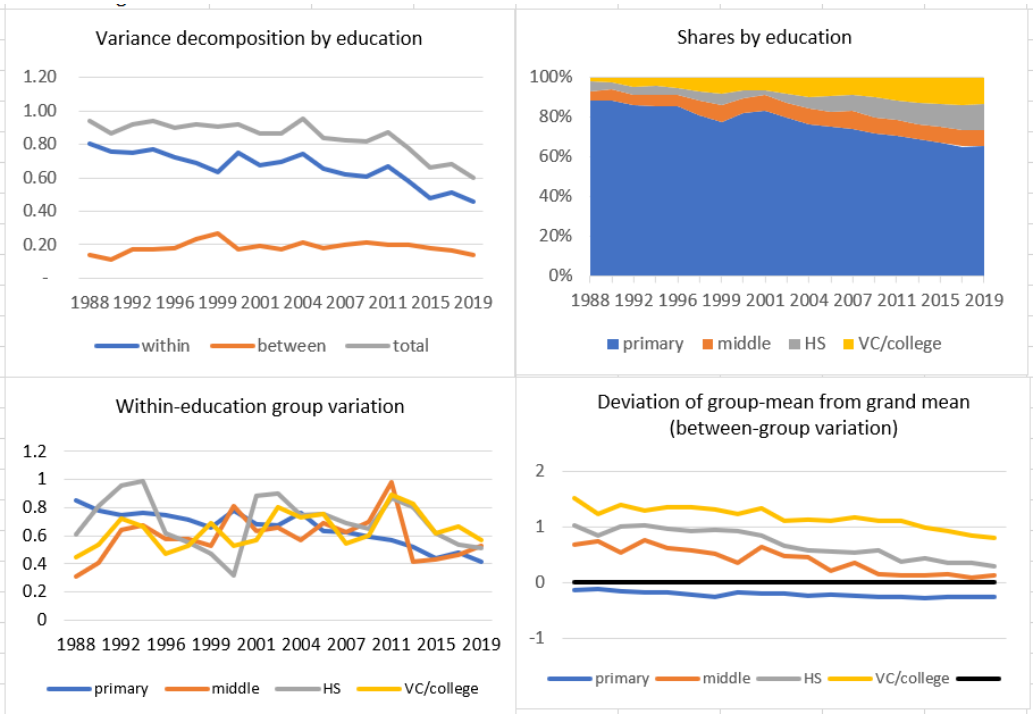


Figure B4: Decomposing earnings inequality among non-farm households by education

Non-farming households: head age 25-54 years old



Non-farming households: head age 55-69 years old



Appendix C: Supplementary tables

Table C.1: Unemployment rate by demographic

		2019 Q1	2019 Q2	2020 Q1	2020 Q2	ΔYoY (Q1)	ΔYoY (Q2)	Diff-Diff (percent point)
	Overall	0.93	0.99	1.05	1.98	0.12	0.99	0.87
Gender	Male	0.98	0.99	1.14	2.00	0.16	1.01	0.85
	Female	0.87	1.00	0.94	1.96	0.07	0.96	0.90
Age	Under 25	4.72	5.86	5.07	8.67	0.35	2.81	2.47
	25-34	1.25	1.03	1.41	2.54	0.16	1.50	1.34
	35-44	0.41	0.42	0.52	1.13	0.11	0.71	0.60
	45-54	0.16	0.20	0.29	0.85	0.13	0.66	0.53
	55-64	0.22	0.13	0.24	0.58	0.02	0.45	0.43
	65-74	0.07	0.11	0.11	0.16	0.04	0.05	0.01
Education	Primary	0.44	0.36	0.51	1.14	0.07	0.78	0.71
	Middle Sch	1.21	1.13	1.27	2.30	0.07	1.17	1.11
	Voc/High Sch	1.20	1.52	1.28	2.51	0.08	1.00	0.92
	Col	1.56	1.78	1.81	2.94	0.24	1.16	0.92
Region	Bangkok	0.79	0.93	0.90	1.70	0.11	0.77	0.66
	Central	0.86	1.07	1.12	2.07	0.26	1.00	0.73
	North	0.84	1.00	0.88	2.16	0.03	1.16	1.12
	NE	0.83	0.78	0.88	1.81	0.05	1.03	0.98
	South	1.50	1.26	1.50	2.18	0.01	0.92	0.92