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**Impact of Covid-19 on The Employment of Informal Thai Workers Industries**

Presented to

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## **Abstract**

Covid-19 was devastating for most economies as it immensely reduced economic output and restricted many market activities. Among the most affected were those working in the informal sectors. Thailand is a country that has a large informal economy, and they were not exempt by the effects of the pandemic. To examine the impacts of the virus to the informal sector in Thailand, the paper uses labor statistics from Thailand's Labor Statistics Yearbook. A paired t-test method was used with Covid-19 as a treatment to analyze changes in employment in 22 industries that the Ministry of Labor deems as 'informal'. Results of the statistics and the t-tests reveal certain changes in employment in certain industries from pre-Covid (2017-2018) to post-Covid (2019-2020).

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## **1.) Introduction**

The Covid-19 pandemic has brought much distress and economies worldwide. Being a global health crisis, many countries were pushed to utilize lockdown measures, travel restrictions, and trade channel closures to help curb the spread of the virus. As a result, GDP worldwide plummeted, corporations were forced to tighten their budgets, and unemployment became widespread across various industries. Among those most affected, the informal workforce has been widely discussed. The question to ask then is: What about Thailand's vast informal economy?

Thai informal workers' marginalization and social exclusion were made worse by the Covid-19 outbreak and subsequent economic collapse. It became increasingly difficult for workers in the informal sector to meet their basic needs of food, shelter, and other necessities, and they often ended up taking on more debt in order to do so. In relation, unemployment and underemployment among informal laborers are expected to rise as a result of the Covid-19 outbreak.

As such, the following paper will aim to explore the impacts that Covid-19 had presented towards the informal sector in terms of employment in various related industries. After data has been collected from credible sources, the author would then be able to test the hypothesis on whether or not Covid-19 has resulted in a reduction of the Thai informal workforce. Other literature will also be used to help with the discussion of results.

### *1.1 Research Question*

What has been the impact of Covid-19 towards employment in the informal economy between 2019-2020?

## 2.) Literature Review

### 2.1 *Thai Informal Sector*

However, while there exists no single definition of the informal economy, it often refers to economic transactions that are unobserved or acknowledged. Household-made goods and services that are not exchanged or paid for, as well as goods and services produced by small-scale producers, are certain examples. Most developing countries, and Thailand in particular, rely heavily on this sector for the production and functionality of the whole economy.

Approximately 2 billion people throughout the globe work as informal laborers. More than 60% of the world's workforce is made up of them, and 90% of those in third world nations (Octavia, 2020). As recent as 1960, 82% of Thailand's workforce was engaged in agriculture. Since then, Thailand's economy has been gradually shifting from an agricultural to a service- and manufacturing-based model (Buddhari & Rugpentum, 2019). In 2012, Thailand had a workforce of 39.6 million, with agricultural employees making up only 35%, while service sector workers made up the majority of the workforce. This results in 62.6% of Thai workers comprising the informal sector.

Social security schemes for informal workers have expanded in Thailand over the years, with some employees receiving coverage on a mandatory basis and others receiving it simply as a voluntary and financial commitment (Kongtip, Nankongnab, Chaikittiporn, Laohaudomchok, Woskie, & Slatin, 2015). In 2001, the Universal Coverage Scheme (UCS) was established to provide universal coverage to people who were not previously covered by current public health protection programs. People over the age of 60 are eligible for a tax-funded 500-Baht dividend, which was introduced in 2008 (Paek, Meemon, & Wan, 2016).

Nevertheless, economists are concerned about the impact of this informal economic sector on inequality and poverty alleviation, notwithstanding the difficulty in assessing its activities and interactions with the formal sector (Pratap & Quintin, 2006). An expanding informal economy may also affect official statistics, resulting in an inefficient allocation of public resources. It is extremely difficult to estimate the extent of an informal economy. There are a number of methods for measuring the extent of the informal sector, but there is no single set of indicators (Narula, 2020).

## *2.2 Impact of Covid-19 on Thai Informal Sector*

The Covid-19 epidemic was estimated to have adversely harmed over 1.6 billion informal laborers causing a 60% drop in wages by mid-2020. (ILO, 2020). There were nearly 500,000 fewer workers in the ten industries with the largest percentage of daily and hourly workers from the first quarter of 2019 and the first quarter of 2020.

A direct impact on the level of activity and job or income losses can be seen as a result of measures affecting market access, demand, imports and access to raw materials and intermediate goods required for production. There is a wide variation in the impact of the crisis and lockdown-related actions on different industries (Malathum & Malathum, 2020). As a result of Covid-19 and other efforts to maintain social distancing, the largest informal economy sectors and subsectors are typically directly affected. Low-skilled agricultural laborers and clerical workers, including those in the service industry, had the biggest drop in employment. In comparison to previous years, the number of health professionals has grown by about 25% throughout 2020 (Komin, Thepparp, Subsing, & Engstrom, 2021).

During Thailand's emergency lockdown period in the middle of 2020, the informal sector operated on a significantly smaller scale. Due to lockdowns and limitations on mobility, agri-food supply chains and markets have been disrupted in rural areas, putting the livelihoods of self-employed and wage employees in danger. Most self-employed people in agriculture and rural areas are informal, as well as most salaried workers and the bulk of family members who contribute to the workforce (Malathum & Malathum, 2020). Furthermore, women outnumber males in high-risk occupations among those in the informal economy who have been affected by the crisis as they make up 42% work in these fields. Covid-19's burden on women's employment is greater than that on men's because of this higher percentage in the high-impact market sectors, such as retail trade and hospitality. It was anticipated that 22 % of the 2019 female labor force will lose their jobs if the worst-case scenario occurs.

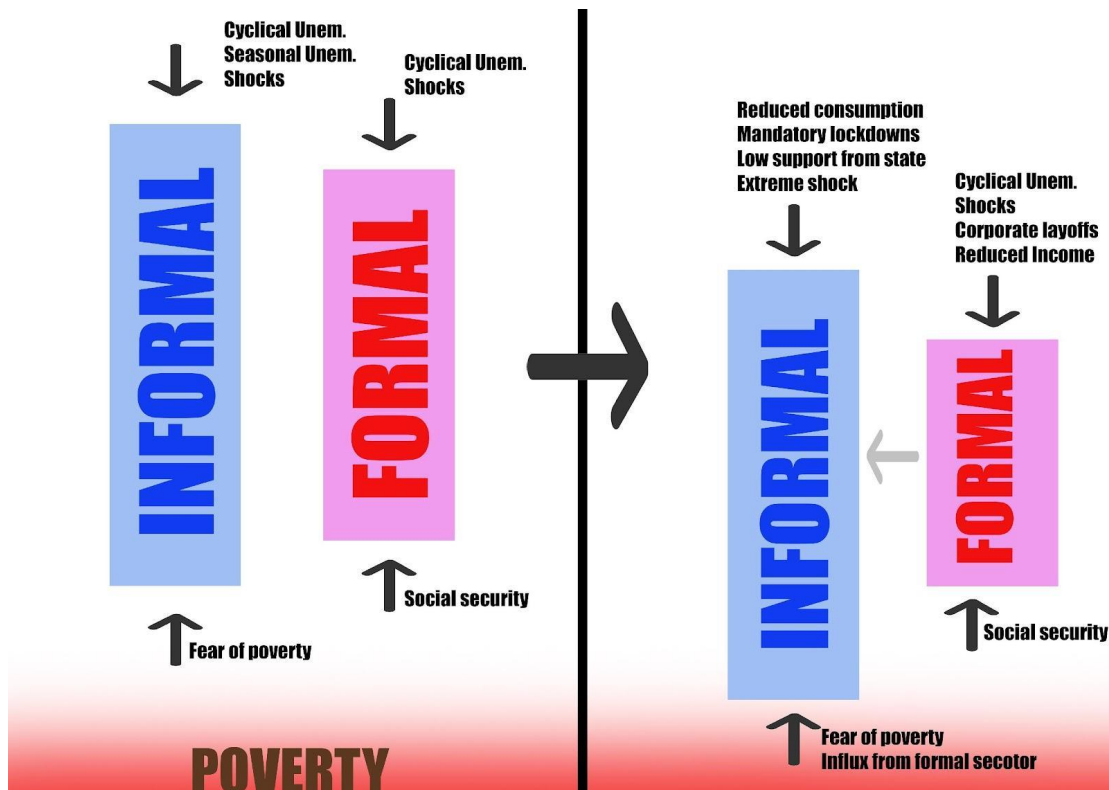
## *2.3 Sensitivity to Shocks of The Informal Sector*

Self-employed and wage workers in the informal sector alike are among the categories most at risk of losing their jobs and wages as a result of economic downturn. Due to the nature of

their employment, they are not entitled to workers' benefits or representation by their employers (Pratap & Quintin, 2006). Various Thai labor laws protect informal workers in the domestic, home-based, and agricultural sectors, although the majority of Thai labor regulations only apply to formal workers (Buddhari & Rugpentum, 2019). There are no effective enforcement mechanisms aimed at safeguarding informal workers since they lack employment contracts and knowledge of their legal rights. In 2019, unpaid leave and sick leave, as well as contributions to social security, were absent from the workplaces for roughly 20 million workers in Thailand.

Unemployment is also rarely an option for informal workers because many cannot afford to go without an income for extended periods of time. Because of this, informal laborers develop a certain level of adaptability, allowing them to easily switch from one source of income to the next (Narula, 2020). Many families with income earners working in the informal sector also typically resort to negative coping tactics including selling assets, borrowing from informal lenders, or employing their children. This further pushes them into poverty and makes it more apparent how devastating an economic downturn is towards this sector.

#### 2.4 Conceptual Framework



As can be seen from the conceptual framework above, the combination of the literature mentioned helps illustrate how informal workers are directly and indirectly affected by the current crisis. The length of the bar represents the number of workers existing in that sector. Demonstrated here, the informal sector contributes a majority of the total Thai labor force with a wider spread than those in formal employment when it comes to their socioeconomic position. Pushes and pulls can be observed above and under which presents economic influences that dictate the productivity/employment of the two.

Afterwards, accompanied by pre-existing issues that they have previously faced, the Covid-19 continues to put extensive pressure on the vulnerable sector. Many articles are in agreement that, with the low level of social security that this sector has, they are more likely to lose their jobs and be pushed lower down towards poverty. The formal sector also experiences a reduction in productivity as many industries are affected by lockdown measures and other policies, but existing social or corporate safety nets provide this sector with some rigidity when it comes to economic shocks.

Nevertheless, it is keen to notice how there is a more significant shrink in the formal economy as the length of the informal sector remains the same. There are theories that suggest that higher unemployment in the formal sector pushes these individuals to seek other channels of income either through investments or informal work. This is supported by the evidence on how the pandemic has caused a rise in demand for day laborers, paid volunteers, and other un-skilled professionals to aid in welfare provisions and to keep certain societal functions afloat. Many businesses and innovative jobs have also been created during this period which could also be categorized as being in the informal sector.

## *2.5 Hypothesis*

H<sub>0</sub>: Covid-19 has no impact on employment in the informal sector in Thailand.

H<sub>1</sub>: Covid-19 has a negative impact on employment in the informal sector in Thailand.

H<sub>2</sub>: Covid-19 has a positive impact on employment in the formal sector in Thailand.

### **3.) Methodology**

The following paper would use two-tailed paired t-tests across 22 industries categorized as 'informal jobs' set by the Thai Ministry of Labor across 4 years with the COVID-19 emergence in 2019 being the treatment in the analysis to measure rates of change between pre- and post-Covid circumstances. The paper would also then separate the data into three sets: total, male, and female informal workers. This is done to examine if there are any significant gender influences involved when it comes to unemployment in the sector once faced with a heavy economic downturn.

#### *3.1 Data*

Due to the nature of this report and limitations in collecting data, sample data was gathered from the 'Labour Statistics Yearbook' from 2017-2018. To assist persons seeking employment that complements their skills, expertise, and talents, while also protecting them from being taken advantage of and ensuring that their rights and benefits are applied fairly and consistently, the Ministry of Labor collects and analyzes data on the Thai labor market then produces it annually to be downloaded publicly. They provide comprehensive information on labor statistics including demographic data (age, gender, location, etc.) and occupational data (industry, formal/informal, public/private, etc.).

Working individuals who do not have the same level of social security as those in regular employment are termed in the yearbook as "informal workers." For the sake of the paper, the author would only be using data on informal employment in 22 industries. These industries include: 1.Agriculture, forestry & fishing 2.Mining and quarrying 3.Manufacturing 4.Electricity,gas,steam supply 5.Water supply 6.Construction 7.Wholesale and retail trade 8.Transportation storage 9.Accommodation and food service 10.Information and communication 11.Financial & insurance activities 12.Real estate activities 13.Professional,scientific and technical 14.Administrative and support services 15.Public administration and defense 16.Education 17.Human health and social work 18.Arts,entertainment 19.Other service activities 20.Activities of household as employers 21.Activities of extraterritorial 22.Unknown.

### *3.2 Empirical Approach*

The SPSS program would be used to run the paired t-test analysis with ‘pre-Covid’ (2017-2018) and ‘post-Covid’ (2019-2020) timeframes as a variable of interest and the emergence of COVID-19 as the treatment. Each industry would be tested for their level of significance with the initial p-value at 0.95 or significance level under 0.05. If this condition is not met, then the results do not reject the null hypothesis( $H_0$ ) meaning that COVID-19 has no significant correlation to employment in the informal sector. If the conditions are met ( $p < 0.05$ ), then positive or negative values would suggest that either the  $H_1$  or  $H_2$  is accurate. The confidence interval of 0.90 would also be tested in case there are few or no results which reject  $H_0$  after testing with the 0.95 confidence interval.

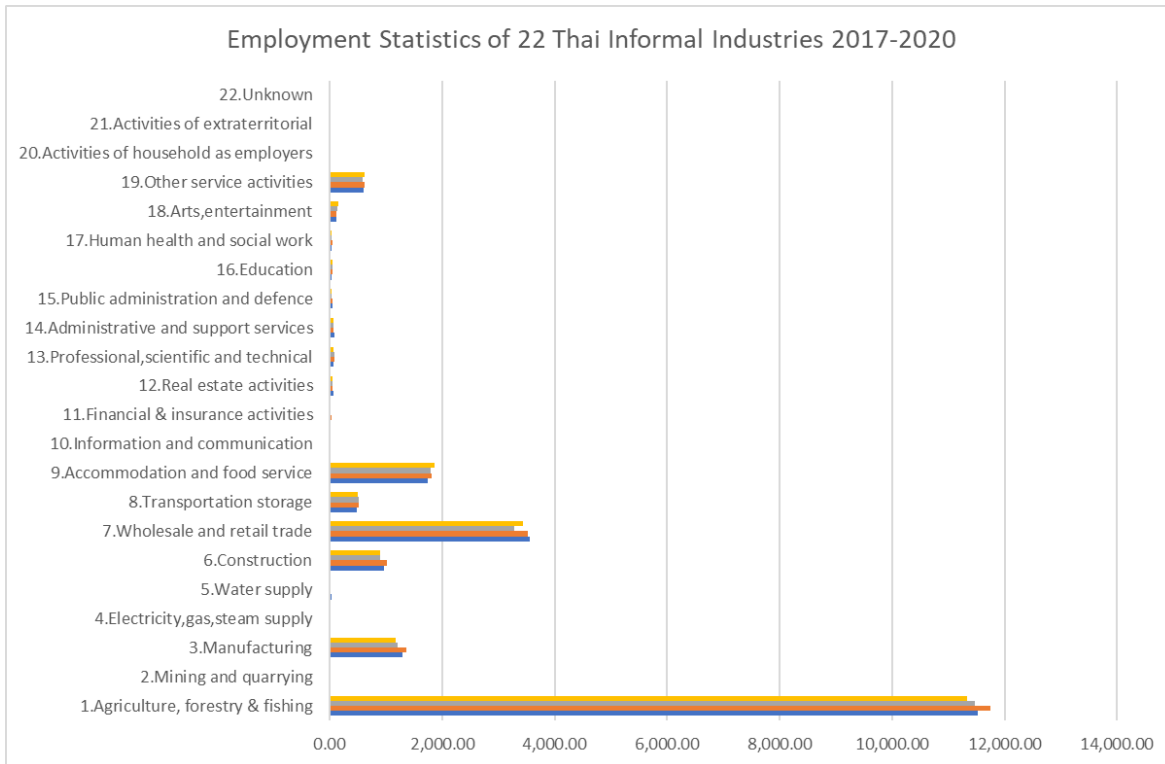
### *3.3 Ethical Concerns*

A concern to raise in this instance is the usage of secondary resources as the primary sample data. Even though the data was collected by credited sources with a sound academic background, since it is used as a reference the accuracy of this report’s translation of the dataset may not be as accurate or may not completely align with the data provided in the data set.

In addition, due to a large population sample that the Ministry of Labor had collected, they summed the data into 1000s of persons per unit. This would mean that if any industry were to have less than 1000 workers at any given point in time, this would mean that the table would express that there are no workers in that industry. Even though the values would be considered insignificant upon running the analyses, it is important to note that there is a ‘hidden workforce’ that has been omitted from the dataset.

## 4.) Results

### 4.1 Sample Characteristics & Description



According to the sample data presented in Table 1 in the appendix, we can see that the data has been broken into total, male, and female, with the number of employment across 2017-2020. For the total informal workforce, there was a significant increase from 2017-2018, but then it dramatically fell in 2019 before climbing up the next year. Males and females follow a similar trend with females showing a more severe decrease and lesser recovery.

By industry, trends are harder to observe and are less consistent. Agriculture was severely hit, possibly also due to the drought that occurred in the beginning of 2019. Mining unexpectedly spiked which is consistent with the increase in power-related industries. Manufacturing and construction both suffered as well as showing very timid recovery.

Finance businesses expressed a sharp increase in 2019, but could be due to rising interest in cryptocurrency or people investing in securities in case of another financial crisis. Administrative businesses are different from others in that it increased in 2019 but then hit a new

low in 2020. Education saw a rise in 2019 but then dropped lower than pre-Covid levels. Contrastingly, despite demand for medical assistant and social work, both industries showed a decreasing trend. Other services returned to nominal levels as household work experienced the most dramatic drop (nearly 75% from 2017-2020).

#### *4.2 Paired Samples Test*

Results of the two-tailed paired t-tests of the 22 industries could be viewed in Table 4 in the appendix. First inspecting the results of the informal sector as a whole, almost none of the results were able to reject the null hypothesis at the confidence interval of 95%. Among the 22 pairs, the only one that shows a significant correlative relationship seems to be between pre-Covid industry 10 and post-Covid industry 10 (Information and Communication). With a negative t-score of 14.316, this means that the introduction of COVID-19 correlates to a fall of -14.316 thousands of workers in this industry. Upon setting the confidence interval to be 90% ( $p < 0.1$ ), only one additional result was proven to reject the null hypothesis which was pre-Covid industry 21 and post-Covid industry 21 (Activities of extraterritoriality). Nevertheless, since there are no values present in this dataset as seen in Table 1 in the appendix, the results are not considered as valid.

Towards looking at only the male informal workforce, results are similar to the total informal workforce results. Once more, there is only one paired result that is able to accept the alternative hypotheses, but is different from that of the previous dataset. Here, pre-Covid industry 16 and post-Covid industry 16 (Education) have a p-value of less than 0.05 with a t-score of 25.000. This means that the introduction of Covid-19 significantly correlates with changes in this industry with an additional 25.00 thousands of workers as a by-product. Upon accepting the 90% confidence interval, there is once more another result that could reject the null hypothesis. Pre-Covid industry 11 and post-Covid industry 11 (Financial & insurance activities) nearly passed the 95% confidence interval at 0.055. With a positive t-score of 11.50, this suggests that the introduction of Covid-19 positively influenced the number of workers in this industry by 11.50 thousands of male workers.

For the female informal workforce, results regarding employment between pre-Covid and post-Covid also share similar characteristics with the two previous datasets. Similarly, to the total informal workforce, there is a significantly strong correlation between pre-Covid industry 10 and post-Covid industry 10 (Information and Communication). At a negative t-score of 86.800, this means that the introduction of Covid-19 resulted in a reduction of -86.00 thousand female workers in this industry. In contrast to males and the overall informal workforce, there are two results for females that are able to reject the null hypothesis at the 90% confidence interval. Firstly, pre-Covid industry 13 and post-Covid industry 13 (Professional, scientific and technical) reject the null hypothesis with a negative t-score of 9.400, which could be interpreted as Covid-19 causing a drop in this industry's female workforce by 9.400 thousands. The second result which rejects the null hypothesis is between pre-Covid industry 19 and post-Covid industry 19 (Other service activities) at a negative t-score of -6.870, meaning that Covid-19 was responsible for female job losses in this industry at 6.870 thousands of workers.

## **5.) Discussion & Conclusion**

The results of the analysis expressed mixed results, but enough to engage in further analysis. Results for industry 11 appear most apparent in explaining how Covid-19 has decreased employment in the informal Information and Communication industry, with further emphasis on the female labor at a significantly high level of negative correlation. This runs parallel to results in Table 1 as the drop in 2019 is equivalent to more than a third of the total workers in that industry.

On a lesser degree, those results with a lower correlation could also be explained by comparing them with labor statistics in Table 1. The professional, scientific, and technical informal workers expressed a consistent decrease throughout the post-Covid 19 period. This is in contrast to the author's first expectations since demand for these services should be higher due to the existence of a health crisis. Though upon further research, this result could be explained by how the government has become more involved to cater these services to the public rather than the informal workers themselves. Providing free healthcare and other welfare benefits became a more appealing option for the Thai population where informal workers in this industry could not

compete (Komin, Thepparp, Subsing, & Engstrom, 2021). Increase in teachers, especially males, could also be explained. This informal industry consists mainly of tutors and other personal trainers. The sudden introduction of the virus marks an opportunity for them to explore online teaching, which has shown to expand quite immensely. Female informal educators on the other hand did not express such an upward trend. Even so, a sudden drop in this industry the following year could also be due to an overinflation of the industry's workforce causing some to retire early due to the many competitors.

Also, overall, there is a consistent trend for almost all industries (with certain exceptions). Most dramatic decreases occur during 2019 when the pandemic just began. Due to the foreign and unexpected nature of this incident, the state and markets alike are not copied to respond so measures were more drastic such as extended lockdowns or massive corporate layoffs. Nevertheless, by 2020 when circumstances have eased and the population have become more accustomed to 'social distancing' and other measures, most of the industries gradually recovered at different rates.

There were also signs that support theories in other articles on the resilience of the informal economy in Thailand. Despite being faced with unemployment, the economy is too dependent on these industries to operate so they need to find strategies to keep their businesses afloat. Even without proper social security and benefits those formal workers have; informal workers are more flexible when it comes to adjusting their market strategy to combat changing market conditions (Narula, 2020). Another supporting theory towards the quick recovery and resilience of some industries during this period are shifts from unemployed workers from formal industries. Even though it was not included in the dataset, the notion was already introduced in the literature review regarding how formal workers would seek new or additional sources of income through the informal economy. During the introduction of Covid-19, many formal companies also struggled to maintain their expenses by laying off employees or decreasing salaries. This makes it more likely for these employees or unemployed formal workers to become more involved in the informal economy since the undocumented nature of the sector would be less complicated for them corporate-wise.

Nevertheless, when paired with statistical data in Table 1, some discrepancies could be seen between the paired t-test results and trends seen from the raw data. Besides the high levels

of correlation for an industry that has been shown to have 0 workers in the dataset, paired t-test results in Finance & Insurance industries showed a positive correlation to Covid-19 despite showing a downward sloping trend. Even so, it could be explained by the lower extreme in 2017 pushing down the average of the pre-Covid period, and that the percentage change between 2019-2020 is not as intense of a jump from

Additionally, gaining support from other literature or looking towards other influences may help uncover some of the aforementioned discrepancies. Results of both the descriptive statistics and the paired t-test have also provided hinted evidence on other possible factors besides Covid-19 affecting changes in employment in the 22 listed informal industries. For example, the farming and fishing communities have already been experiencing drought and resource shortage issues even prior to the introduction of Covid-19 which would explain the exaggeration in the decrease in employed workers.

In conclusion, initial results may have shown that there was a significant drop in employment among industries in the Thai informal sector, but there were no long-lasting effects on overall employment in this sector empirically speaking. It is undeniable that Covid-19 has dealt damage to all economic sectors alike, but the resilience and dependence the Thai population has towards the sector helps sustain it until employment is able to recover to more nominal levels after Thai citizens have adjusted to crisis conditions. Also, the mixed results looking towards industry-specific may not be sufficient in gaining an overall understanding of the state of the informal sector in Thailand. Including more factors such as overtime earnings during the crisis, shifts in employment, and other economic indicators would also be great indicators to heighten the accuracy of this paper. Future research in this field should put this into consideration.

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## Appendix

Table 1. *NUMBER OF THE INFORMAL EMPLOYMENT BY INDUSTRY AND SEX, WHOLE KINGDOM, 2018 – 2020 (In Thousands of People)*

Year	Total				Male				Female			
	2017	2018	2019	2020	2017	2018	2019	2020	2017	2018	2019	2020
Total	20,774.30	<b>21,189.60</b>	<b>20,344.10</b>	<b>20,364.40</b>	<b>11,511.40</b>	<b>11,679.90</b>	<b>11,328.20</b>	<b>11,203.60</b>	<b>9,262.80</b>	<b>9,509.70</b>	<b>9,015.80</b>	<b>9,160.80</b>
1.Agriculture, forestry & fishing	11,515.80	11,754.90	11,471.40	11,329.40	6,688.70	6,799.20	6,736.60	6,611.80	4,827.10	4,955.80	4,734.80	4,717.60
2.Mining and quarrying	7.9	3.9	11.6	4.1	5.9	3.1	7	3.3	2	0.8	4.6	0.9
3.Manufacturing	1,291.00	1,357.00	1,214.90	1,177.10	592.8	608.3	541.6	507.3	698.2	748.7	673.2	669.8
4.Electricity,gas ,steam supply	0.9	-	0.7	-	0.3	-	0.7	-	0.6	-	-	-
5.Water supply	37.3	17.3	15	13	21	10.2	9.9	9.2	16.2	7.1	5.1	3.8
6.Construction	971.2	1,021.50	901.3	903.1	838	865	778.6	767.6	133.2	156.5	122.7	135.5

7. Wholesale and retail trade	3,566.80	3,524.70	3,278.80	3,444.00	1,698.90	1,672.10	1,573.40	1,633.00	1,867.90	1,852.60	1,705.30	1,811.00
8. Transportation and storage	484.6	519.8	522	500.8	453	488.8	491.6	465.6	31.7	31	30.4	35.2
9. Accommodation and food service	1,743.50	1,821.20	1,801.70	1,871.80	604.2	637	619.5	643.7	1,139.30	1,184.20	1,182.20	1,228.10
10. Information and communication	13.9	17.4	10.8	13.6	10.9	11.4	8.4	9.3	3	6	2.4	4.3
11. Financial & insurance activities	20.6	27	25.5	18.1	12.9	15.3	13.6	8.8	7.7	11.7	12	9.3
12. Real estate activities	63.1	46	52.4	49.9	39.8	24.4	23.9	24	23.3	21.7	28.5	25.9
13. Professional, scientific and technical	70.2	92	81.8	61.9	48.9	63.4	57.9	43.3	21.2	28.6	23.9	18.6
14. Administrative and support services	87.5	70.8	72.4	66	54.2	45.5	44.2	41.2	33.2	25.4	28.1	24.8
15. Public administration and defence	49.4	43.3	37.5	42.9	28.5	27.3	25.9	24.9	20.9	16	11.6	18
16. Education	41.2	52.8	53.4	50.7	13.1	18.1	21.9	16.6	28.1	34.7	31.5	34.1
17. Human health and social work	41	49.6	41.5	39.2	8.1	8.1	9.5	5.9	32.9	41.5	32	33.3

18.Arts,entertainment	127.6	122.1	144	147	80.7	72.7	79	84	46.9	49.4	65	62.9
19.Other service activities	611.1	624	587.9	624.6	304.4	302.9	281.2	300.7	306.7	321.1	306.7	323.9
20.Activities of household as employers	25	19.5	14	5.4	5.2	3.8	1.2	1.6	19.8	15.7	12.9	3.8
21.Activities of extraterritorial	-	-	-	-	-	-	-	-	-	-	-	-
22.Unknown	4.7	4.6	5.7	1.8	1.9	3.3	2.7	1.8	2.9	1.4	3	0

Source : National Statistical Office, Ministry of Digital Economy and Society

Table 2. *PAIRED SAMPLE STATISTICS*

**Paired Samples Statistics**

id1			Mean	N	Std. Deviation	Std. Error Mean
Total	Pair 1	pre-Covid1	20981.9500	2	293.66145	207.65000
		post-Covid1	20354.2500	2	14.35427	10.15000
	Pair 2	pre-Covid2	11635.3500	2	169.06923	119.55000
		post-Covid2	11400.4000	2	100.40916	71.00000
	Pair 3	pre-Covid3	5.9000	2	2.82843	2.00000
		post-Covid3	7.8500	2	5.30330	3.75000
	Pair 4	pre-Covid4	1324.0000	2	46.66905	33.00000
		post-Covid4	1196.0000	2	26.72864	18.90000
	Pair 5	pre-Covid5	0.9000	1 <sup>a</sup>		

	post-Covid5	0.7000	1 <sup>a</sup>		
Pair 6	pre-Covid6	27.3000	2	14.14214	10.00000
	post-Covid6	14.0000	2	1.41421	1.00000
Pair 7	pre-Covid7	996.3500	2	35.56747	25.15000
	post-Covid7	902.2000	2	1.27279	0.90000
Pair 8	pre-Covid8	3545.7500	2	29.76920	21.05000
	post-Covid8	3361.4000	2	116.81404	82.60000
Pair 9	pre-Covid9	502.2000	2	24.89016	17.60000
	post-Covid9	511.4000	2	14.99066	10.60000
Pair 10	pre-Covid10	1782.3500	2	54.94220	38.85000
	post-Covid10	1836.7500	2	49.56819	35.05000
Pair 11	pre-Covid11	15.6500	2	2.47487	1.75000
	post-Covid11	12.2000	2	1.97990	1.40000
Pair 12	pre-Covid12	23.8000	2	4.52548	3.20000
	post-Covid12	21.8000	2	5.23259	3.70000
Pair 13	pre-Covid13	54.5500	2	12.09153	8.55000
	post-Covid13	51.1500	2	1.76777	1.25000
Pair 14	pre-Covid14	81.1000	2	15.41493	10.90000
	post-Covid14	71.8500	2	14.07142	9.95000
Pair 15	pre-Covid15	79.1500	2	11.80868	8.35000
	post-Covid15	69.2000	2	4.52548	3.20000
Pair 16	pre-Covid16	46.3500	2	4.31335	3.05000
	post-Covid16	40.2000	2	3.81838	2.70000

Pair 17	pre-Covid17	47.0000	2	8.20244	5.80000
	post-Covid17	52.0500	2	1.90919	1.35000
Pair 18	pre-Covid18	45.3000	2	6.08112	4.30000
	post-Covid18	40.3500	2	1.62635	1.15000
Pair 19	pre-Covid19	124.8500	2	3.88909	2.75000
	post-Covid19	145.5000	2	2.12132	1.50000
Pair 20	pre-Covid20	617.5500	2	9.12168	6.45000
	post-Covid20	606.2500	2	25.95082	18.35000
Pair 21	pre-Covid21	22.2500	2	3.88909	2.75000
	post-Covid21	9.7000	2	6.08112	4.30000
Pair 22	pre-Covid23	4.6500	2	0.07071	0.05000
	post-Covid23	3.7500	2	2.75772	1.95000
Male Pair 1	pre-Covid1	11595.6500	2	119.14749	84.25000
	post-Covid1	11265.9000	2	88.10550	62.30000
Pair 2	pre-Covid2	6743.9500	2	78.13530	55.25000
	post-Covid2	6674.2000	2	88.24693	62.40000
Pair 3	pre-Covid3	4.5000	2	1.97990	1.40000
	post-Covid3	5.1500	2	2.61630	1.85000
Pair 4	pre-Covid4	600.5500	2	10.96016	7.75000
	post-Covid4	524.4500	2	24.25376	17.15000
Pair 5	pre-Covid5	0.3000	1 <sup>a</sup>		
	post-Covid5	0.7000	1 <sup>a</sup>		
Pair 6	pre-Covid6	15.6000	2	7.63675	5.40000

	post-Covid6	9.5500	2	0.49497	0.35000
Pair 7	pre-Covid7	851.5000	2	19.09188	13.50000
	post-Covid7	773.1000	2	7.77817	5.50000
Pair 8	pre-Covid8	1685.5000	2	18.95046	13.40000
	post-Covid8	1603.2000	2	42.14356	29.80000
Pair 9	pre-Covid9	470.9000	2	25.31442	17.90000
	post-Covid9	478.6000	2	18.38478	13.00000
Pair 10	pre-Covid10	620.6000	2	23.19310	16.40000
	post-Covid10	631.6000	2	17.11198	12.10000
Pair 11	pre-Covid11	11.1500	2	0.35355	0.25000
	post-Covid11	8.8500	2	0.63640	0.45000
Pair 12	pre-Covid12	14.1000	2	1.69706	1.20000
	post-Covid12	11.2000	2	3.39411	2.40000
Pair 13	pre-Covid13	32.1000	2	10.88944	7.70000
	post-Covid13	23.9500	2	0.07071	0.05000
Pair 14	pre-Covid14	56.1500	2	10.25305	7.25000
	post-Covid14	50.6000	2	10.32376	7.30000
Pair 15	pre-Covid15	49.8500	2	6.15183	4.35000
	post-Covid15	42.7000	2	2.12132	1.50000
Pair 16	pre-Covid16	27.9000	2	0.84853	0.60000
	post-Covid16	25.4000	2	0.70711	0.50000
Pair 17	pre-Covid17	15.6000	2	3.53553	2.50000
	post-Covid17	19.2500	2	3.74767	2.65000

Pair 18	pre-Covid18	8.1000	2	0.00000	0.00000	
	post-Covid18	7.7000	2	2.54558	1.80000	
Pair 19	pre-Covid19	76.7000	2	5.65685	4.00000	
	post-Covid19	81.5000	2	3.53553	2.50000	
Pair 20	pre-Covid20	303.6500	2	1.06066	0.75000	
	post-Covid20	290.9500	2	13.78858	9.75000	
Pair 21	pre-Covid21	4.5000	2	0.98995	0.70000	
	post-Covid21	1.4000	2	0.28284	0.20000	
Pair 22	pre-Covid23	2.6000	2	0.98995	0.70000	
	post-Covid23	2.2500	2	0.63640	0.45000	
Female	Pair 1	pre-Covid1	9386.2500	2	174.58466	123.45000
		post-Covid1	9088.3000	2	102.53048	72.50000
	Pair 2	pre-Covid2	4891.4500	2	91.00464	64.35000
		post-Covid2	4726.2000	2	12.16224	8.60000
	Pair 3	pre-Covid3	1.4000	2	0.84853	0.60000
		post-Covid3	2.7500	2	2.61630	1.85000
	Pair 4	pre-Covid4	723.4500	2	35.70889	25.25000
		post-Covid4	671.5000	2	2.40416	1.70000
	Pair 5	pre-Covid5	0.6000	1 <sup>a</sup>		
		post-Covid5	0.6000	1 <sup>a</sup>		
	Pair 6	pre-Covid6	11.6500	2	6.43467	4.55000
		post-Covid6	4.4500	2	0.91924	0.65000

Pair 7	pre-Covid7	144.8500	2	16.47559	11.65000
	post-Covid7	129.1000	2	9.05097	6.40000
Pair 8	pre-Covid8	1860.2500	2	10.81873	7.65000
	post-Covid8	1758.1500	2	74.74119	52.85000
Pair 9	pre-Covid9	31.3500	2	0.49497	0.35000
	post-Covid9	32.8000	2	3.39411	2.40000
Pair 10	pre-Covid10	1161.7500	2	31.74909	22.45000
	post-Covid10	1205.1500	2	32.45620	22.95000
Pair 11	pre-Covid11	4.5000	2	2.12132	1.50000
	post-Covid11	3.3500	2	1.34350	0.95000
Pair 12	pre-Covid12	9.7000	2	2.82843	2.00000
	post-Covid12	10.6500	2	1.90919	1.35000
Pair 13	pre-Covid13	22.5000	2	1.13137	0.80000
	post-Covid13	27.2000	2	1.83848	1.30000
Pair 14	pre-Covid14	24.9000	2	5.23259	3.70000
	post-Covid14	21.2500	2	3.74767	2.65000
Pair 15	pre-Covid15	29.3000	2	5.51543	3.90000
	post-Covid15	26.4500	2	2.33345	1.65000
Pair 16	pre-Covid16	18.4500	2	3.46482	2.45000
	post-Covid16	14.8000	2	4.52548	3.20000
Pair 17	pre-Covid17	31.4000	2	4.66690	3.30000
	post-Covid17	32.8000	2	1.83848	1.30000

Pair 18	pre-Covid18	37.2000	2	6.08112	4.30000
	post-Covid18	32.6500	2	0.91924	0.65000
Pair 19	pre-Covid19	48.1500	2	1.76777	1.25000
	post-Covid19	63.9500	2	1.48492	1.05000
Pair 20	pre-Covid20	313.9000	2	10.18234	7.20000
	post-Covid20	315.3000	2	12.16224	8.60000
Pair 21	pre-Covid21	17.7500	2	2.89914	2.05000
	post-Covid21	8.3500	2	6.43467	4.55000
Pair 22	pre-Covid23	2.1500	2	1.06066	0.75000
	post-Covid23	1.5000	2	2.12132	1.50000

a. The correlation and t cannot be computed because the sum of caseweights is less than or equal to 1.

Table 3. *PAIRED SAMPLES TEST*

### Paired Samples Test

id1			Paired Differences					t	df	Sig. (2-tailed)
			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
Total	Pair 1	pre-Covid1 - post-Covid1	627.70000	279.30718	197.50000	-1881.77544	3137.17544	3.178	1	0.194
	Pair 2	pre-Covid2 - post-Covid2	234.95000	269.47839	190.55000	-2186.21731	2656.11731	1.233	1	0.434

Pai r 3	pre-Covid3 - post-Covid3	-1.95 000	2.4748 7	1.7500 0	-24.18 586	20.285 86	-1.1 14	1	0.466
Pai r 4	pre-Covid4 - post-Covid4	128.0 0000	73.397 68	51.900 00	-531.4 5203	787.45 203	2.46 6	1	0.245
Pai r 6	pre-Covid6 - post-Covid6	13.30 000	12.727 92	9.0000 0	-101.0 5584	127.65 584	1.47 8	1	0.379
Pai r 7	pre-Covid7 - post-Covid7	94.15 000	34.294 68	24.250 00	-213.9 7546	402.27 546	3.88 2	1	0.160
Pai r 8	pre-Covid8 - post-Covid8	184.3 5000	146.58 324	103.65 000	-1132. 64812	1501.3 4812	1.77 9	1	0.326
Pai r 9	pre-Covid9 - post-Covid9	-9.20 000	39.880 82	28.200 00	-367.5 1497	349.11 497	-0.3 26	1	0.799
Pai r 10	pre-Covid10 - post-Covid10	-54.4 0000	5.3740 1	3.8000 0	-102.6 8358	-6.116 42	-14. 316	1	0.044
Pai r 11	pre-Covid11 - post-Covid11	3.450 00	0.4949 7	0.3500 0	-0.997 17	7.8971 7	9.85 7	1	0.064
Pai r 12	pre-Covid12 - post-Covid12	2.000 00	9.7580 7	6.9000 0	-85.67 281	89.672 81	0.29 0	1	0.820
Pai r 13	pre-Covid13 - post-Covid13	3.400 00	10.323 76	7.3000 0	-89.35 529	96.155 29	0.46 6	1	0.723
Pai r 14	pre-Covid14 - post-Covid14	9.250 00	29.486 35	20.850 00	-255.6 7437	274.17 437	0.44 4	1	0.734

	post-Covid14								
Pair 15	pre-Covid15 - post-Covid15	9.9500	7.28320	5.15000	-55.48695	75.38695	1.932	1	0.304
Pair 16	pre-Covid16 - post-Covid16	6.1500	8.13173	5.75000	-66.91068	79.21068	1.070	1	0.479
Pair 17	pre-Covid17 - post-Covid17	-5.05000	10.11163	7.15000	-95.89936	85.79936	-0.706	1	0.609
Pair 18	pre-Covid18 - post-Covid18	4.9500	7.70746	5.45000	-64.29882	74.19882	0.908	1	0.531
Pair 19	pre-Covid19 - post-Covid19	-20.65000	6.01041	4.25000	-74.65137	33.35137	-4.859	1	0.129
Pair 20	pre-Covid20 - post-Covid20	11.3000	16.82914	11.9000	-139.90384	162.50384	0.950	1	0.516
Pair 21	pre-Covid21 - post-Covid21	12.5500	2.19203	1.55000	-7.14462	32.24462	8.097	1	0.078

	Pai	pre-Covid23	0.900	2.6870	1.9000	-23.24	25.041	0.47	1	0.718
	r	-	00	1	0	179	79	4		
	22	post-Covid23								
Ma	Pai	pre-Covid1	329.7	207.25	146.55	-1532.	2191.8	2.25	1	0.266
le	r 1	post-Covid1	5000	300	000	34430	4430	0		
	Pai	pre-Covid2	69.75	166.38	117.65	-1425.	1564.6	0.59	1	0.659
	r 2	post-Covid2	000	223	000	13499	3499	3		
	Pai	pre-Covid3	-0.65	0.6364	0.4500	-6.367	5.0677	-1.4	1	0.386
	r 3	post-Covid3	000	0	0	79	9	44		
	Pai	pre-Covid4	76.10	35.213	24.900	-240.2	392.48	3.05	1	0.201
	r 4	post-Covid4	000	92	00	8450	450	6		
	Pai	pre-Covid6	6.050	7.1417	5.0500	-58.11	70.216	1.19	1	0.443
	r 6	post-Covid6	00	8	0	633	33	8		
	Pai	pre-Covid7	78.40	26.870	19.000	-163.0	319.81	4.12	1	0.151
	r 7	post-Covid7	000	06	00	1789	789	6		
	Pai	pre-Covid8	82.30	61.094	43.200	-466.6	631.20	1.90	1	0.308
	r 8	post-Covid8	000	03	00	0804	804	5		
	Pai	pre-Covid9	-7.70	43.699	30.900	-400.3	384.92	-0.2	1	0.845
	r 9	post-Covid9	000	20	00	2173	173	49		
	Pai	pre-Covid10	-11.0	6.0811	4.3000	-65.63	43.636	-2.5	1	0.237
	r	-	0000	2	0	668	68	58		
	10	post-Covid10								
	Pai	pre-Covid11	2.300	0.2828	0.2000	-0.241	4.8412	11.5	1	0.055
	r	-	00	4	0	24	4	00		
	11	post-Covid11								
	Pai	pre-Covid12	2.900	5.0911	3.6000	-42.84	48.642	0.80	1	0.568
	r	-	00	7	0	234	34	6		
	12									

	post-Covid12								
Pair 13	pre-Covid13 - post-Covid13	8.15000	10.96016	7.75000	-90.32309	106.62309	1.052	1	0.484
Pair 14	pre-Covid14 - post-Covid14	5.55000	20.57681	14.55000	-179.32528	190.42528	0.381	1	0.768
Pair 15	pre-Covid15 - post-Covid15	7.15000	4.03051	2.85000	-29.06268	43.36268	2.509	1	0.241
Pair 16	pre-Covid16 - post-Covid16	2.50000	0.14142	0.10000	1.22938	3.77062	25.000	1	0.025
Pair 17	pre-Covid17 - post-Covid17	-3.65000	7.28320	5.15000	-69.08695	61.78695	-0.709	1	0.607
Pair 18	pre-Covid18 - post-Covid18	0.40000	2.54558	1.80000	-22.47117	23.27117	0.222	1	0.861
Pair 19	pre-Covid19 - post-Covid19	-4.80000	9.19239	6.50000	-87.39033	77.79033	-0.738	1	0.595

Female	Pair 20	pre-Covid20 - post-Covid20	12.7000	14.84924	10.5000	-120.71515	146.11515	1.210	1	0.440
	Pair 21	pre-Covid21 - post-Covid21	3.1000	1.27279	0.90000	-8.33558	14.53558	3.444	1	0.180
	Pair 22	pre-Covid23 - post-Covid23	0.3500	1.62635	1.15000	-14.26214	14.96214	0.304	1	0.812
	Pair 1	pre-Covid1 - post-Covid1	297.95000	72.05418	50.95000	-349.43113	945.33113	5.848	1	0.108
	Pair 2	pre-Covid2 - post-Covid2	165.25000	103.16688	72.95000	-761.66764	1092.16764	2.265	1	0.265
	Pair 3	pre-Covid3 - post-Covid3	-1.35000	1.76777	1.25000	-17.23276	14.53276	-1.080	1	0.476
	Pair 4	pre-Covid4 - post-Covid4	51.95000	38.11306	26.95000	-290.48222	394.38222	1.928	1	0.305
	Pair 6	pre-Covid6 - post-Covid6	7.2000	5.51543	3.90000	-42.35420	56.75420	1.846	1	0.316
	Pair 7	pre-Covid7 - post-Covid7	15.75000	7.42462	5.25000	-50.95757	82.45757	3.000	1	0.205
Pair 8	pre-Covid8 - post-Covid8	102.10000	85.55992	60.50000	-666.62539	870.82539	1.688	1	0.341	
Pair 9	pre-Covid9 - post-Covid9	-1.45000	3.88909	2.75000	-36.39206	33.49206	-0.527	1	0.691	

Pai r 10	pre-Covid10 - post-Covid10	-43.4 0000	0.7071 1	0.5000 0	-49.75 310	-37.04 690	-86. 800	1	0.007
Pai r 11	pre-Covid11 - post-Covid11	1.150 00	0.7778 2	0.5500 0	-5.838 41	8.1384 1	2.09 1	1	0.284
Pai r 12	pre-Covid12 - post-Covid12	-0.95 000	4.7376 2	3.3500 0	-43.51 579	41.615 79	-0.2 84	1	0.824
Pai r 13	pre-Covid13 - post-Covid13	-4.70 000	0.7071 1	0.5000 0	-11.05 310	1.6531 0	-9.4 00	1	0.067
Pai r 14	pre-Covid14 - post-Covid14	3.650 00	8.9802 6	6.3500 0	-77.03 440	84.334 40	0.57 5	1	0.668
Pai r 15	pre-Covid15 - post-Covid15	2.850 00	3.1819 8	2.2500 0	-25.73 896	31.438 96	1.26 7	1	0.425
Pai r 16	pre-Covid16 - post-Covid16	3.650 00	7.9903 1	5.6500 0	-68.14 006	75.440 06	0.64 6	1	0.635
Pai r 17	pre-Covid17 - post-Covid17	-1.40 000	2.8284 3	2.0000 0	-26.81 241	24.012 41	-0.7 00	1	0.611

	post-Covid17								
Pair 18	pre-Covid18 - post-Covid18	4.5500	5.16188	3.65000	-41.82765	50.92765	1.247	1	0.430
Pair 19	pre-Covid19 - post-Covid19	-15.80000	3.25269	2.30000	-45.02427	13.42427	-6.870	1	0.092
Pair 20	pre-Covid20 - post-Covid20	-1.40000	1.97990	1.40000	-19.18869	16.38869	-1.000	1	0.500
Pair 21	pre-Covid21 - post-Covid21	9.40000	3.53553	2.50000	-22.36551	41.16551	3.760	1	0.165
Pair 22	pre-Covid23 - post-Covid23	0.65000	1.06066	0.75000	-8.87965	10.17965	0.867	1	0.545