EE 406 : Contemporary Economic Issues

Thailand Private Consumption Index (PCI): Service Index (SI): VAT Hotel & Restaurant Index With an impact analysis of COVID-19 pandemic using the alternative indicators

Presented to
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Introduction

Economic report, one of the economic values that both private sector and public sector are looking for, is an announcement from the Office of the National and Social Development Council (NESDC) that the institution will collect, assemble, analyze the information, and release the report to the public on a quarter basis, and the announcement will be two months after the end of the quarter. Even though this report is an official and the most accurate, there is one disadvantage as mentioned which is the lateness of the announcement. This concern has been raised to people and investors for the unavailability to adjust themselves from the current economic circumstances. The Bank of Thailand (BoT) decided to report the alternative announcement that can also illustrate the important economic data to the public in many dimensions. With the purpose of releasing the accurate, fast, and more often, private sector and public sector can obtain the data for preliminary monitoring and forecasting the economic situation as the Bank of Thailand will provide and announce the economic report monthly. However, with the quicker duration to provide the report by BoT, there will be some imperfections in the data compared to that of the Office of the National and Social Development Council (NESDC). Therefore, important indices which are Private Consumption Index (PCI) and Private Consumption Index (PII) have been publicly provided.

Private Consumption Index (PCI) is one of the economic indicators that measure an important domestic demand which can navigate the direction of the domestic demand and supply or private expenditure from people, private companies, including foreign expenses. All of these mentioned will reflect the overall direct purchasing power of the private sector. The data for computing the index are Non-Durables index, Semi-Durables index, Durables index, Service index, and Non-residents expenditures index. Tourism, one of an important economic data under the Private Consumption Index (PCI) and sub index under the Service index reflected in term of the VAT of hotel and restaurant index, in Thailand has been claimed as one of the dominant sectors that contribute a large amount of Gross Domestic Product to the Kingdom of Thailand. In the past historical trend, there has been an exponentially upward sloping trend of tourism revenue since 1980, and a strong stable upward sloping trend for more than a decade. The amount of the tourism revenue contributed as share GDP is range from 9 percent in year 2013, 17.7 percent in year 2016, and sharply increase to 21.9 percent in year 2019. This index including restaurant industry and

hotel industry is important to Thailand in term of economic activities and also be verified when Thailand faced with a huge drop in forecasted GDP due to external shocks such as big flood and recent COVID-19 pandemic. Furthermore, from our empirical data analysis and computation collected from the Organization for Economic Co-operation and Development (OECD), it is ensured that the contribution from the hotel and restaurant really have significant impact through spill-over effect to other industries in Thailand, and the result also support with our statement. With the sharply increased in both forward and backward multipliers over decades from 1.3x to 1.6x and 1.9x to 2.6x respectively, according to table 1 in appendix 2, Thai government also consider this significant impact and decide to move encourage and enhance these industries to the new Thailand's economic S-curve according to the announcement published in the Royal Gazette as Thailand 4.0, , the government's ambitious 20-year strategy to accelerate the Kingdom's development to a more advanced level became a formal and certified national policy which is designed to promote and support innovation, creativity, research and development, higher and green technologies. Tourism also contributes a lot to the labor market and workforce. It is claimed that Thailand has ranked in the fifth place in the Asia Pacific region that create a job under the tourism industry which more than five million people are hired as of year 2018.

Getting deeper in to the introduction of hotel industry. Before the COVID-19 impact, Thailand 's hotel industry is also a dominant player in Thailand that contribute a large amount of revenue as a consequence from the tourism industry. According to the data in appendix 1 in figure 1, the revenue from the hotel and restaurant is also have the parallel patten trend as the tourism industry which is an upward sloping trend more than ten years. With the strong growth rate mentioned, there are many popular players come and invest as a capital inflow investment in Thailand specifically in the high-end market customers segmentation due to a high opportunity. Not only because of the quantitative reasons, but hotel industry is also in-line with the new economic S-curve, therefore, government has fully given the authority to encourage and stimulate this industry, and Tourism Authority Thailand (TAT) have already launched the plan accordingly. The plan aims to change the way of travelling behavior as a value-based economy transformation that enhancing on innovation, technological improvement, knowledge, and creativity combining altogether can passthrough the existing way of traveling to sustainable tourist destination, where tourists are not only concern more on the quantity they get, but also more on the quality of the

destination. To confirm this dominant industry, Thailand tourism industry is placed at the first ranking in Asia Pacific region in the issue of abundant of natural resources, placed at the third ranking in the Southeast Asia of travel and tourism competitiveness index, and also placed at the thirty-first ranking in the world about the travel and tourism competitiveness index.

Restaurant industry is an industry that has a high relation with tourism industry. Because the expansion and high annual growth rate of the tourism have an important role to support the expansion of the number of restaurants in Thailand both directly and indirectly. According to the appendix 1 in figure 2 and 3, the number of restaurant and the capital registered have increased from year 2017 to 2018 by 9.52 percent and 50.54 percent respectively. This numerical data is also supported by the trend of tourism revenue in the same year which has increased by the rate of 4-5 percent annually of the market capitalization according to the appendix 1 in figure 4.

Even Thailand has a strong industries outlook in the tourism, hotel, and restaurant prior to the external shocks, when the first case had been confirmed and reported, the situation and condition have been worsened. Tourism industry, one of the heaviest impacts have been reached, was forecasted to contract by almost 90 percent since the first wave. Also, hotel have been affected directly from the shock of closing the tourism industries and with the restriction of movement across the provinces. Restaurant also affect from this situation of closed-dining and switch to food delivery service only. To analyze the impact and prediction, the alternative indicators also be another method to specify these consequences along with the conventional data. Therefore, there will be the analysis of the alternative indicators with the conventional data accordingly in this report with some implementation from the pandemic and also the suggestion and policy recommendations, under the hypothesis of a significantly drop affected from the impact of COVID-19 pandemic.

Literature Review

The research has main focus on the trend of the Private Consumption Index (PCI) with the alternative indicators used to predict and forecast along with the traditional data. In the case of Thailand, there are many published articles related to the index domestically and internationally to forecast and predict the main industries contribution. The main issues can be classified into three main categories which are by research methodology, by set of data, and by sub-topics.

1) Research Methodology
    - Most of the report use the similar methodology by obtaining the data from the official sources and firstly predict the GDP by using the regression method, or by obtaining from other independent source.
    - Based on Bank of Thailand, the forecasted method in the tourism industry comprises of econometric and also the scenario analysis which is the methodology that used to forecast the scenario of the forecasted GDP in Thailand, with acceptable confidence level of error as involved in the regression as well.
    - Based on the Krungsri Research, the methodology is processed by the used of Travel & Tourism competitiveness index and also analytical of constructing the travel bubble potential and percent of cases compared to its peak on the xy-plane, according to the appendix 1 in figure 5.
    - Not only the methodology will be a mathematical analysis, but also the logical qualitative method is incorporated, based on many articles.

2) Datasets
    - Based on the articles and publications, the data sets that used to analyze in the research are fully the official data. None of them use the alternative set of data for the prediction. The official data obtained for the articles' analysis are come from both internationally and domestically.

- Based on the Krungsri Research, the official data they used is from the Ministry of Tourism & Sports (MOTS) to predict all of the important information, for example the number of passengers arrival to Thailand, the occupancy rate of the hotel rooms, nationality of passengers, etc.
- UOB Research also use the data to support the statement from the Bank of Thailand to predict and forecast the hotel industry outlook after the reopening the country and also after the high proportion of the Thai residents who already get vaccinated, and also some suggestions to recover.
- Bank of Thailand and VISA also use the information from the Ministry of Tourism & Sports (MOTS) and Tourism Authority Thailand (TAT) to predict the trend that have been analyzed from the top-down view to be in-line with the current economic outlook.
- According to the Fitch Rating, the forecasted for the Thailand's recovery is based on the US Federal Reserves.

3) Sub-topics *(industry outlook, performance, and potential to recover)*
   - There are clear evidences including empirical studies and statistical data and information based on many articles that Thailand's tourism industry together with hotel and restaurant industries have a very significant contribution to the Thai economy and GDP, with a very spill-over effect to other industries in Thailand as well.
   - After the effect of COVID-19 pandemic, the reports published at the initial of the spreading of the virus have been underestimated this situation that also be one of the results of under preparation in many activities including the business operation aspect, and also the public health aspect. With a very high infection rate, there is a overcontrolled of the infected case situation that had been worsen the economic situation and Thailand's sentiment index in both economic/ business activities and financial activities according to the data provided.

- From many of the articles and researches review , there is a postponement of the countries re-opening during a few months ago, with uncertainty in the government announcement and news declaration. With this reason, it is unable to forecast with high accuracy rate.
- In the meantime, there are a lot of revised versions of researches and papers written and published concerning of the liquidation of SMEs and entrepreneurs about the ability to recover during the lockdown that degraded the performance of the overall industry and economic outlook.

4) Research Gap

- After the revision of many articles, publications, and also the research paper, there are the research gap seen on these mentioned and can be separated into three sub-topics of consideration.
- First it is about the way of presenting data, it is unavoidable when the forecasting is incorporated, the complexity of conveying the information is higher. When taking the normal citizens into account, it is much better to digest deeper and communicate as the normal language rather than a lot of mathematical involvement.
- Second it is about the source of data, all of the organizations and institutions use the official data as mentioned, instead of combining the alternative set of data together in the analysis, in which the advantages and disadvantages of official data has been mentioned above. It would be better way of forecasting and analyzing the industries with the supporting of additional alternative set of data and indicators.
- Third is about the timing of input data, because the nature of business of publication have been perceived that it needs to be fast, when the analyst face with the unavailable data in some number, due to the duration of data collection from official institution, it needs to be forecasted, which could be affected to the accuracy of that research paper.

Data & Research Methodology

The data used in this study is a time series data range from January 1st, 2007 until September 30th, 2021 to evaluate the pattern and trend of the conventional index with the alternative set of data in order to evaluate the effect after COVID-19 pandemic hit the targeted industries in this study, with the frequency of monthly data.

Data	Source of Data	Unit
VAT hotel & restaurant index	Bank of Thailand	Standardized index
Keyword search	Google Trend	Number of words
Input-Output Table	OECD	Million Baht

Table i) Source of Data

The methodologies that used in this paper are the regression analysis as the quantitative forecasted, and also other additional alternatives data sets as the quantitative prediction. Firstly, the data are obtained from many primary and secondary sources. The Private Consumption Index (PCI) will be exported into Microsoft Excel as a conventional data. The keywords obtaining from the google trend are also exported to Microsoft Excel as an alternative dataset. As the objective of this paper has been clearly stated, the graphs of each alternative's indicators have been constructed to firstly observe the pattern and the trend of the time series data trying to match up with the conventional data. The related methodologies that have been referred into this analysis is the Ordinary Least Squared Regression (OLS regression). After taking the econometric course and also reviewing many literatures and researches, this method is the most common way of the economic forecasting, trying to explained the dependent variable based on the independent variables collected from many sources both official and unofficial source, with the constraint to minimize the value of sum of squared differences between the dependent and independent variables.

The general OLS regression model: $\boldsymbol{Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + ... + \beta_n X_n + U_i}$

Where Y_i = Dependent variable

α = Intercept in the regression model

β = Coefficient of each independent variables

X = Independent variables

U_i = error term of the regression model

This is general regression model setting that will be further expand to our model related to our index which the VAT Hotel & Restaurant Index that will be explained by both official and unofficial set of data. The forecasting from this model will be applied as well as explaining the trend and pattern.

The OLS regression model regard to this paper: $\boldsymbol{Y_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + U_i}$

Variables	Description	Predictive sign
y	Conventional data "VAT Hotel & Restaurant Index"	-
X_1	The google trend keyword searched "Huahin"	Positive (+)
X_2	The google trend keyword searched "Chiang Mai"	Positive (+)
X_3	The google trend keyword searched "Hostel"	Positive (+)
X_4	The google trend keyword searched "Restaurant"	Positive (+)
U_i	Error term of the regression model	-

Table ii) Description of the dependent and independent variables used in the paper's model with the predictive sign of independent variables

Result analysis and discussion

After running the OLS regression analysis model to observe the pattern of the of the trend of VAT Hotel & Restaurant Index that can be partly explained by the independent alternative keywords used from the google trend, the result is satisfy with all of the significant value at the 5 percent confidence level. The data is contained the sample observation size of 177 observations with the monthly data. The exogeneous variable are the keywords related to the tourism industries, hotel industries, and restaurant industries. Because the purpose of this report is aim on using the alternative indicators as a part of the forecasting in many institutions, and to show how accurate of keywords in google trend which is the alternative sources of data can be performed in this analysis.

According to the appendix 2 in table 2, the table is included the summary of the result, the confidence interval with the 5 percent level of significant, and also the F-test and T-test of the model and each independent variable respectively. It can be observed that all of the independent variables in this OLS regression model are strongly significant. Because the chosen keywords from google trend used as the variables in this equation can be also predicted the trend of the VAT Hotel & Restaurant Index after the pandemic initially hit. Firstly, observing at the trend of the conventional index along with the alternative data set. According to the appendix 1 in figure 6, the pattern/ trend of the time series conventional index is continuing as a seasonal pattern. The movement of the graph is peak on the high season of tourists and reach the bottom at the low season of tourist destination. With the regard of COVID-19 pandemic, the index graph is sharply drop which is parallel with the announcement from the Thai government. This trend is also occurred in the same way as the all of the alternative data did. According to the appendix 1 in figure 7, there is a huge drop in the time stamp of year 2020, January, in all of the data set. So, it is undeniable that there are some relationships between these two sets of data and the linkage that can be analyzed and predicted the impact in the future with the high accuracy rate and in-time than any other official set of data did.

After a clear graphical illustration of data, according to the appendix 1 in figure 5, the power of prediction can be easily seen by the graph plotted between the official data from the Bank of Thailand and alternative data from the google trend, it can be seen that all of four keywords obtain from the google trend can perform a traced back forecasted of the pre-covid period and post-covid period very well. The dots plotted on the graph are have a high similarity.

With the result provided, in my perspective, using these mentioned alternatives data can be a part of forecasting process properly which can enhance the accuracy and data supporting. In the meantime, the process of trial and error for using a number of keyword search has been already done, but the accuracy of the model and the significant rate in each independent variable are still not satisfied. Therefore, the selected keywords will be come from many dimensions which are travel, hotel, and restaurant aiming to eliminate the situation of having the high correlation among the independent variables themselves.

The discussion in my point of view is that people always desire a fast information from the reliable institutions in both private sector and public sector. One of the disadvantages mentioned above for the official public data is the delayed of the announcement, despite the accuracy of the information it is. They are all demanding for a good forecasted for the adaptation to survive in the current economic situation for the business operation and investment not an outdated of them. Alternative data and indicators, a forgotten mathematical measurement, are played an important role for the data analysis. Not only the high predictive level of the alternative data when choosing the right set of information, but also the time constraint will be crossed out. The result of conducting the research is almost parallel with the assumptions and key issues and questions have been raised in the first section.

The limitation of this research would be the power of prediction that can be separated into two main part which are dataset issue and the used of mathematical methodologies issue. Because the index that used in this research and experiment is the VAT Hotel & Restaurant Index obtained from the Bank of Thailand. this index has a lot of components consisted which are come from the side of hotel industry and also come from the side of restaurant industry, with a very high complexity in the calculation from Bank of Thailand before launched as the index provided to the public. In order to forecast this index with a very high accuracy, it might need an advance mathematical technique and higher level of econometrics that will lead to a reduction in error term and increase the independent terms as well. Because in this empirical result has been used the general form of the OLS regression without any kind of adjustment, however, in the reality, the human behavior of computing the index including travelling, eating, and booking any hotel is not quite exactly in the same manner as the prediction did, regard with the lack of time frame in the search engine and the actual behavior that might be the delayed of action caused a little missed in this aspect.

Conclusion

The main issue has been raised since the beginning of this paper, where the effectiveness of the alternative data set combined with the conventional data, with the analysis of impact during the COVID-19 pandemic in Thailand. This research question will lead to questioning about the effectiveness of using the alternative data purely after the external economic shock.

After reviewing many literatures and articles, there are research gap appeared that can be further improved, and it can be divided into three main parts which are data presentation, sources of data, and launched time of the official economic report. First, it is about the way of presenting data, it is unavoidable when the forecasting is incorporated, the complexity of conveying the information is higher. When taking the normal citizens into account, it is much better to digest deeper and communicate as the normal language rather than a lot of mathematical involvement. Second, it is about the source of data, all of the organizations and institutions use the official data as mentioned, instead of combining the alternative set of data together in the analysis, in which the advantages and disadvantages of official data has been mentioned above. It would be better way

of forecasting and analyzing the industries with the supporting of additional alternative set of data and indicators. Third is about the timing of input data, because the nature of business of publication have been perceived that it needs to be fast, when the analyst face with the unavailable data in some number, due to the duration of data collection from official institution, it needs to be forecasted, which could be affected to the accuracy of that research paper.

The data used in this study is a time series data range from January 1st, 2007 until September 30th, 2021 to evaluate the pattern and trend of the conventional index with the alternative set of data in order to evaluate the effect after COVID-19 pandemic hit the targeted industries in this study, with the frequency of monthly data, and also the methodology used in this research will be the Ordinary Least Squared Regression (OLS regression). Noted that, the keywords used in the analysis is already tried to eliminate the correlation the independent variables term and the insignificant variables.

The key findings in this analysis are using the alternatives indicators can be one of the effective ways as a proxy of the official data from the delayed. The result shows a significant impact of the current situation that can be explained verry well, as the result is satisfy with all of the significant value at the 5 percent confidence level. The data is contained the sample observation size of 177 observations with the monthly data. The exogeneous variable are the keywords related to the tourism industries, hotel industries, and restaurant industries. Because the purpose of this report is aim on using the alternative indicators as a part of the forecasting in many institutions, and to show how accurate of keywords in google trend which is the alternative sources of data can be performed in this analysis. It can be partly ensured that while using the official data for analysis, the alternative set of information can be a supplementary as well.

Therefore, in the current situation where the information, data, and news flow very fast with the immediate response from the receivers. All of the parties need a high responsibility to perform their data analysis and digest all of the needed information for the residentials. Moving with the fast pace can dominate the competitors which are the other countries in this context, and can resulted in the spontaneous and continuous adaptation effect which can be upgraded the country' status in the broad perspective.

Policy recommendation

The new economic S-curve also has a tourism industry as one of the main new engines that drive Thailand. Government also encouraged and have a lot of implementations on this perspective, with many stimulus packages involved in.

In part of the facilitator's operation, the amount of the budget in research and development should be increased, due to the lack behind any other neighbor countries that invest a huge amount of money in research and development compared to its GDP. The high growth rate will be swiftly occurred when there is an implementation on a huge amount of money spent on this section. Also, a consequence from investing in research and development, the alternative platform of information will be more encouraged and higher of accessibility to the organizations to use as an additional backup evidence in any decisions and forecasting.

In the part of economic stimulation, this severe shock creates an unavoidable impact to all sectors, weakening all the forecasted economic direction. Based on the evidences and results, COVID-19 affects economic and financial activities invaluably. Government should intervene higher serious restriction to control the spreading with peacefully subsidized the effected business enterprises. More concerns on the public health and system are highly recommended regard to the last wave of the uncontrollability of the infected cases and that situation.

Suggestion for further research

1) The methodology used in this research is a normal Ordinary Least Squared Regression (OLS regression) that could be improved by using other form of the regression analysis in order to enhance the accuracy

2) The range of the keywords search. The google trend will explore the data based on the keyword set by the users. The further analysis could be used higher scope of the words related to the VAT Hotel & Restaurant Index directly and indirectly which might also be fitted well with the analysis.

3) Additional alternative data sets should be recommended. This research only uses one main alternative data set which is the google trend. It can be developed in the further research to use more alternative data sets involved in the forecasting accordingly both numerical data and non-numerical data.

4) Further research analysis may be more concern on the qualitative measurement as in this research statistical result might be more concentrated on the quantitative result. So, it would be highly recommended to evaluate more on the impact of COVID-19 pandemic through the qualitative data that might require a higher technique of the valuation.

5) Last recommendation is focus on the scope of time interested. Because the purpose of this research is emphasized more on the broad trend in the long-term scope, with some of the impacts after the situation of corona virus, if the further research can deeply reduce the time frame to only the time before-and-after the COVID-19 shocks, it can capture a be deeply captured more details, as this research might suit for the overall picture of the VAT Hotel & Restaurant Index paralleled with the alternative data set and analysis after the pandemic accordingly.

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Appendix 1: Figures

Figure 1: The contribution of hotel and restaurant to GDP since year 2011

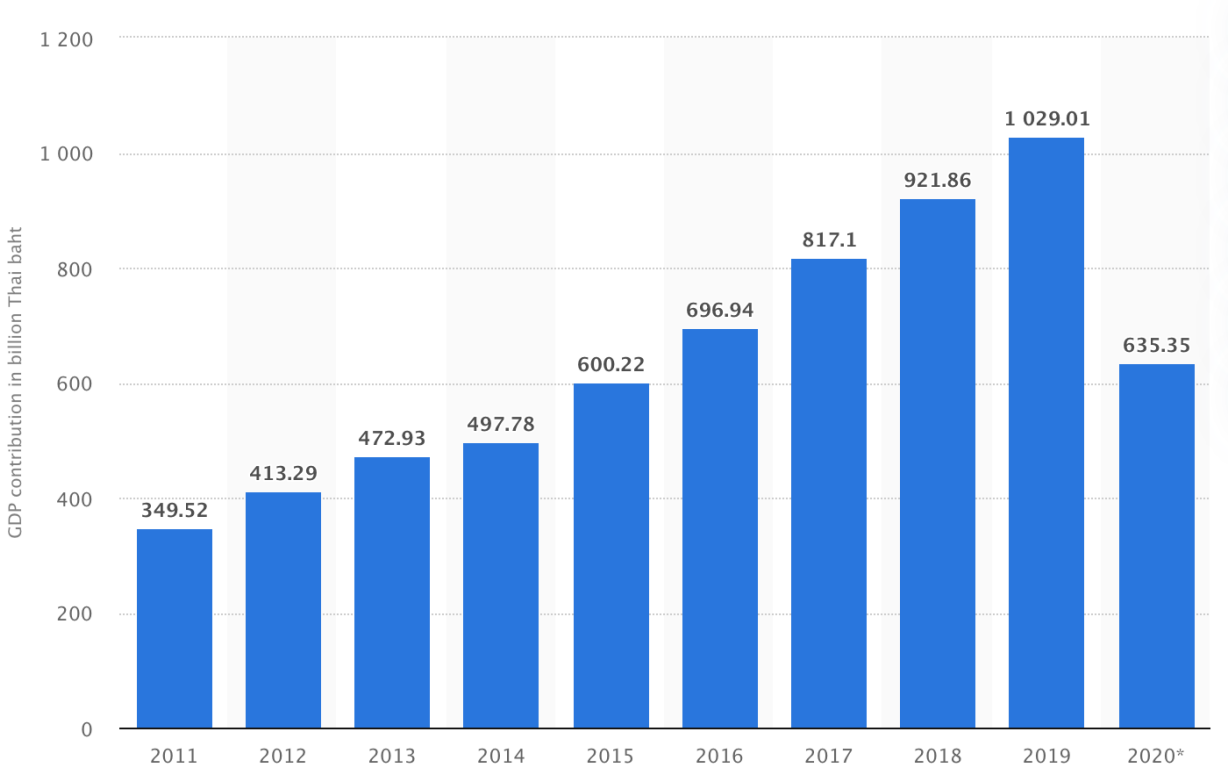


Figure 2: New registered restaurant (unit)

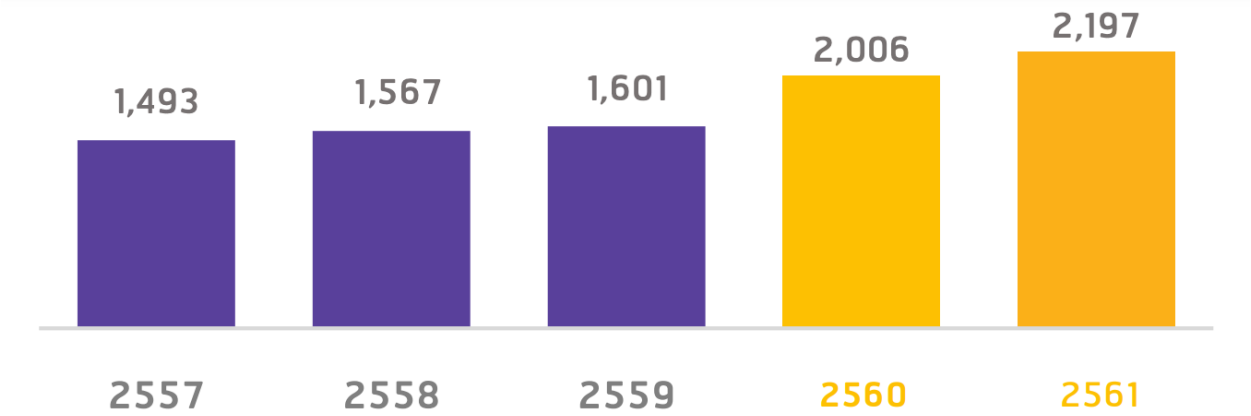


Figure 3: New registered capital of registered restaurant (million baht)

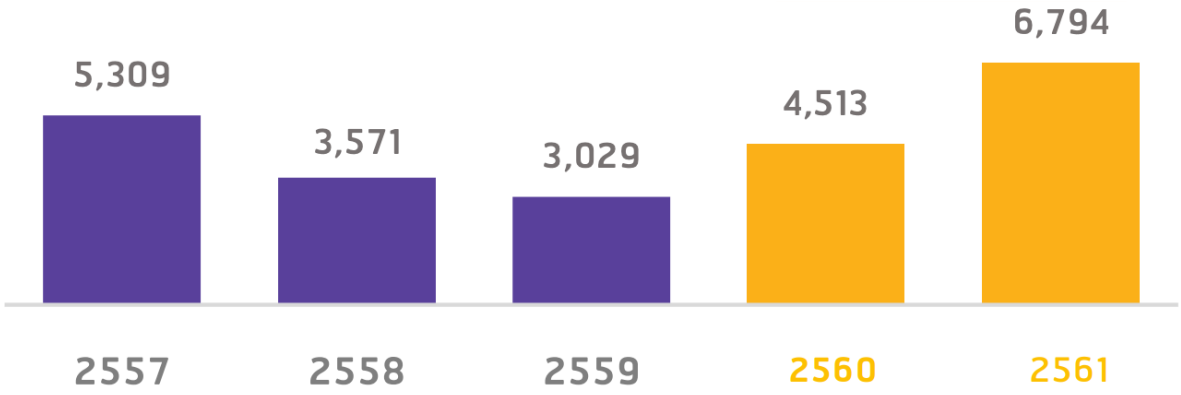


Figure 4: Tourism revenue in Thailand (million USD)

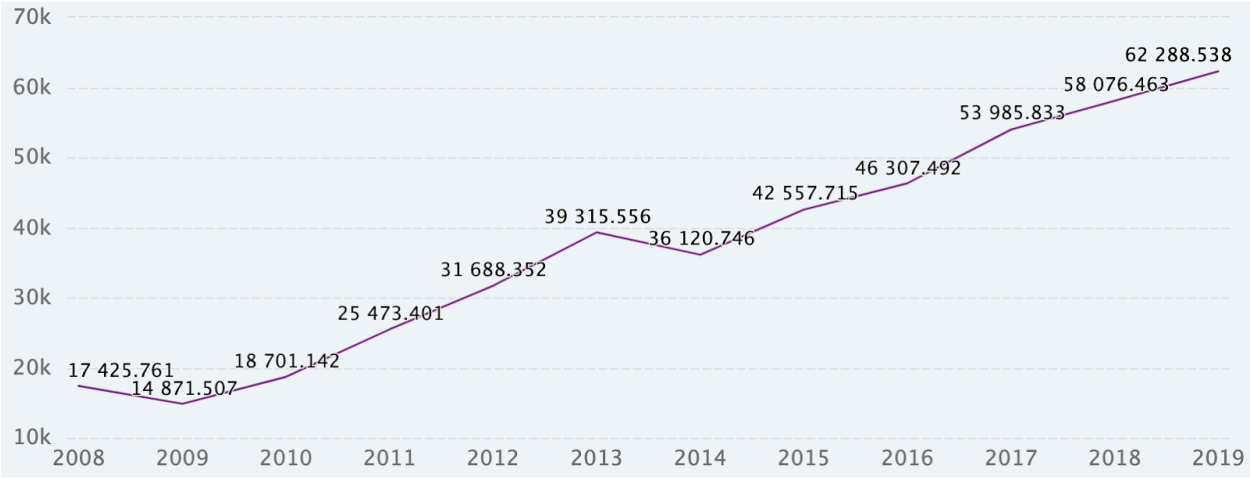
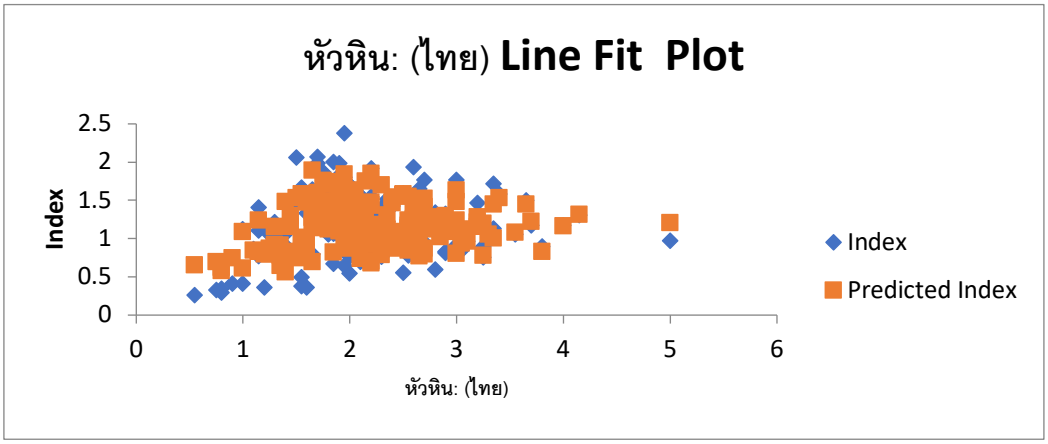


Figure 5: The figure of line fit plot of each keyword searched with the predicted index.

Figure 5.1: The figure of line fit plot of "Huahin (Thai)" with the predicted index



. *Figure 5.2: The figure of line fit plot of "Chiang Mai (Thai)" with the predicted index*

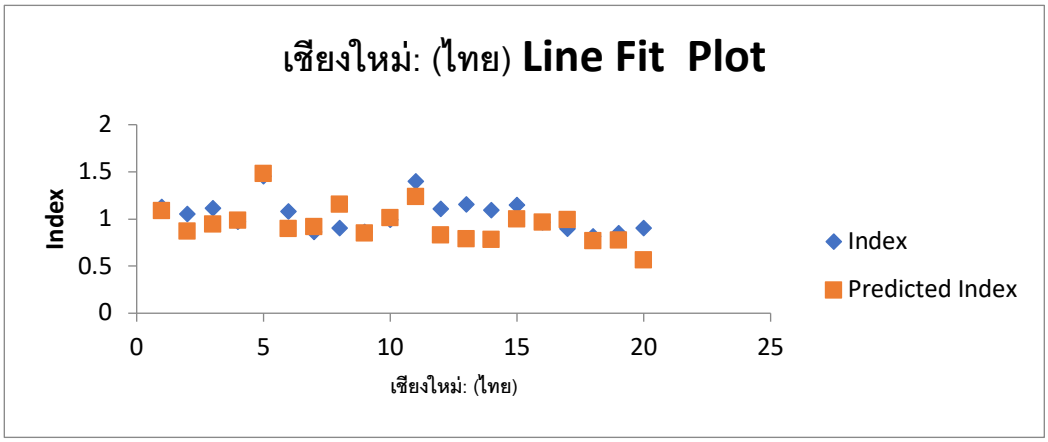


Figure 5.3: The figure of line fit plot of "Hostel (Thai)" with the predicted index

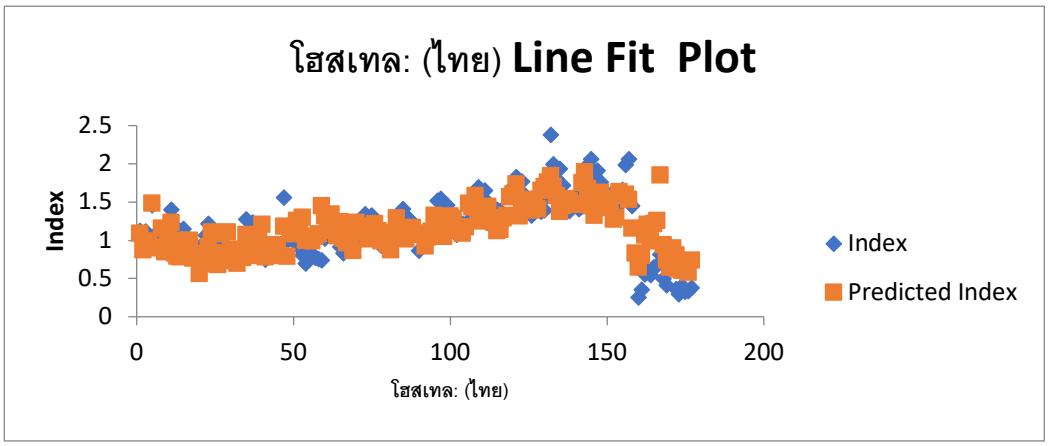


Figure 5.4: The figure of line fit plot of "Restaurant (Thai)" with the predicted index

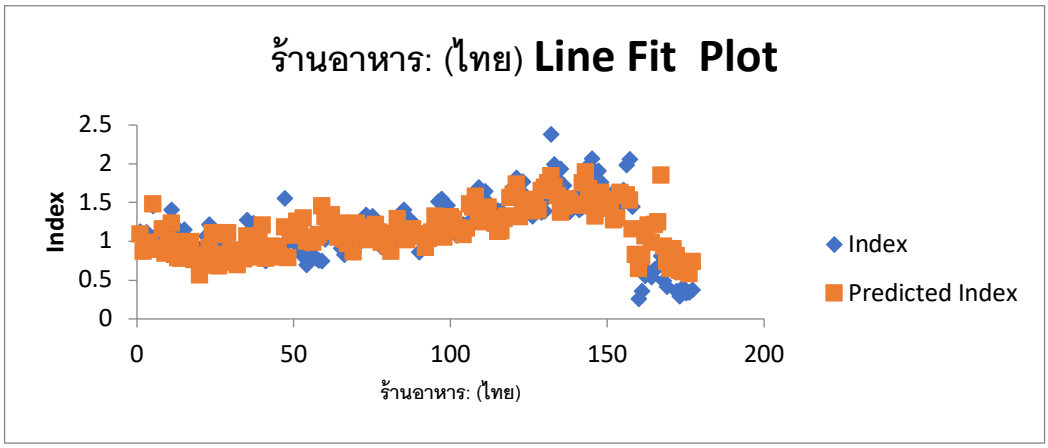


Figure 6: The time series data of the standardized VAT hotel & restaurant index

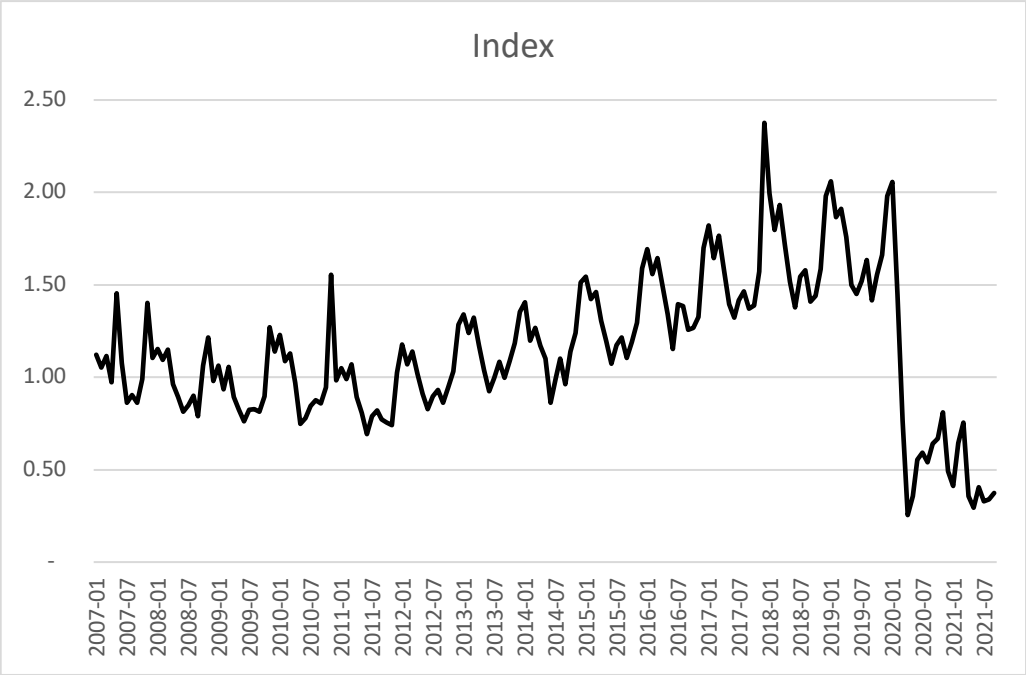


Figure 7: The time series data of the standardized google trend keywords

Figure 7.1: The time series data of the standardized google trend "Huahin (Thai)" keyword

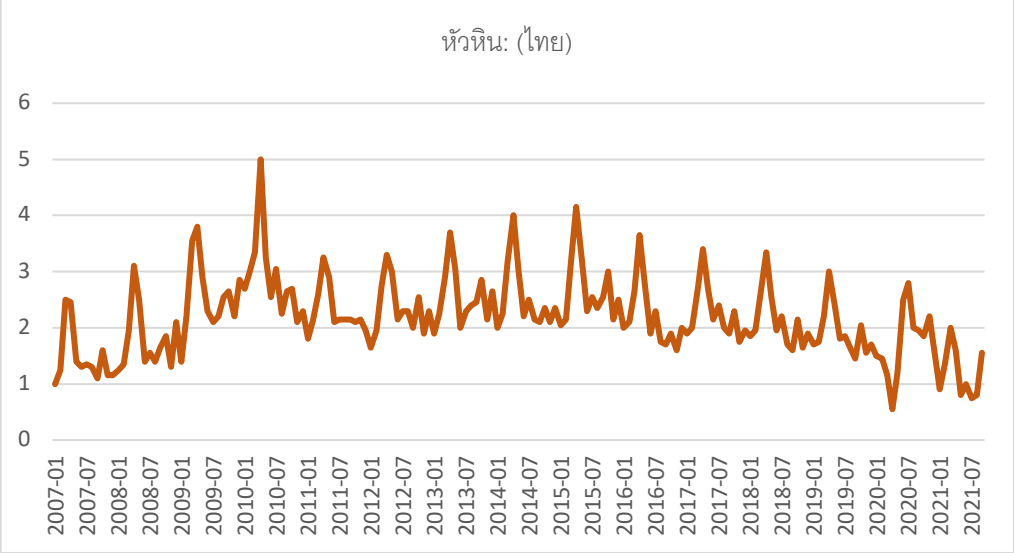


Figure 7.2: The time series data of the standardized google trend "Chiang Mai (Thai)" keyword

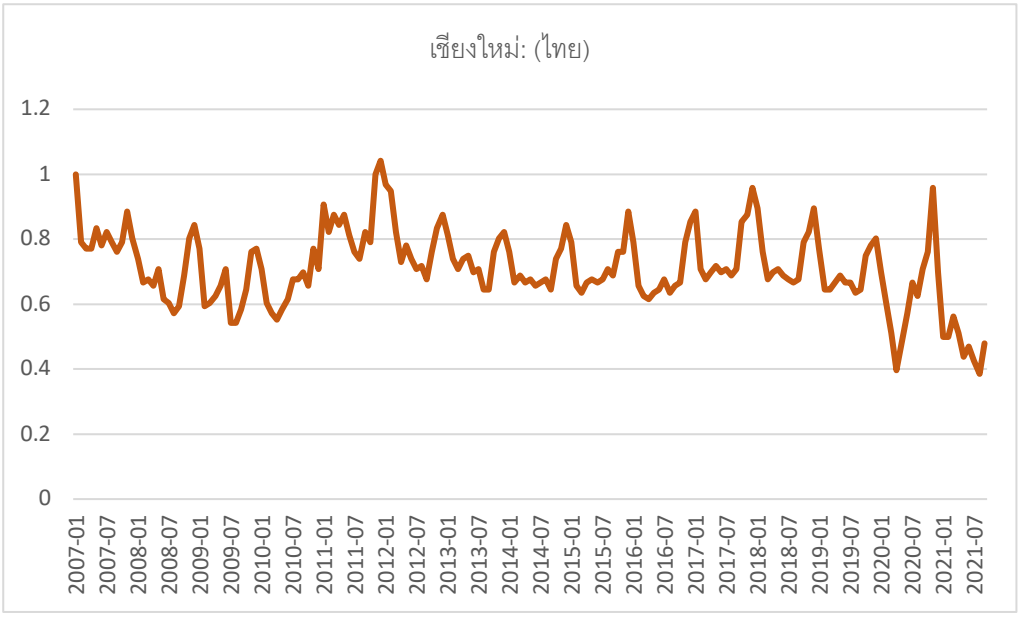


Figure 7.3: The time series data of the standardized google trend "Hostel (Thai)" keyword

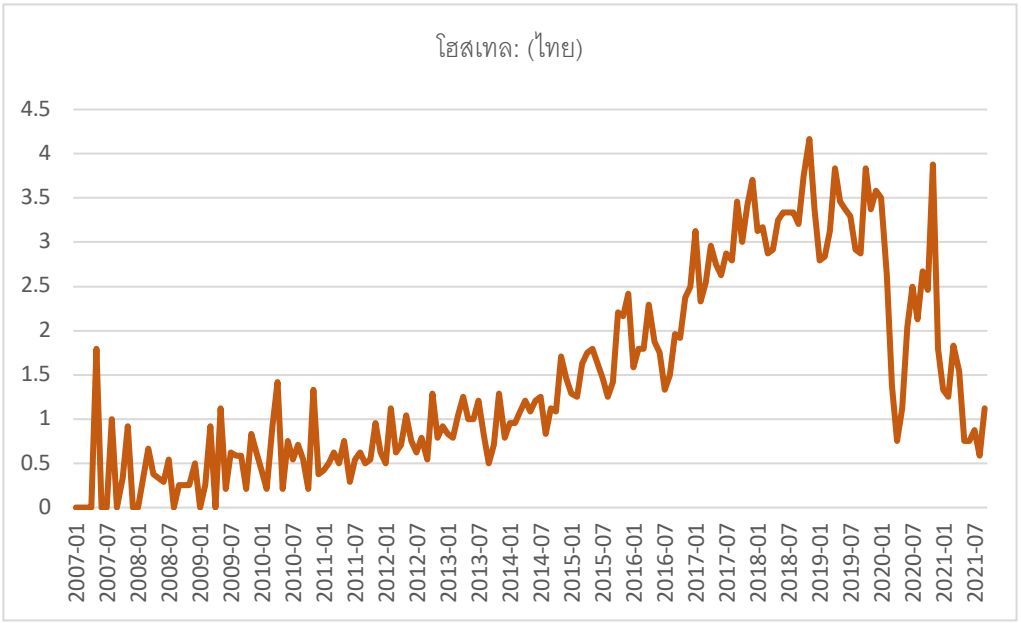
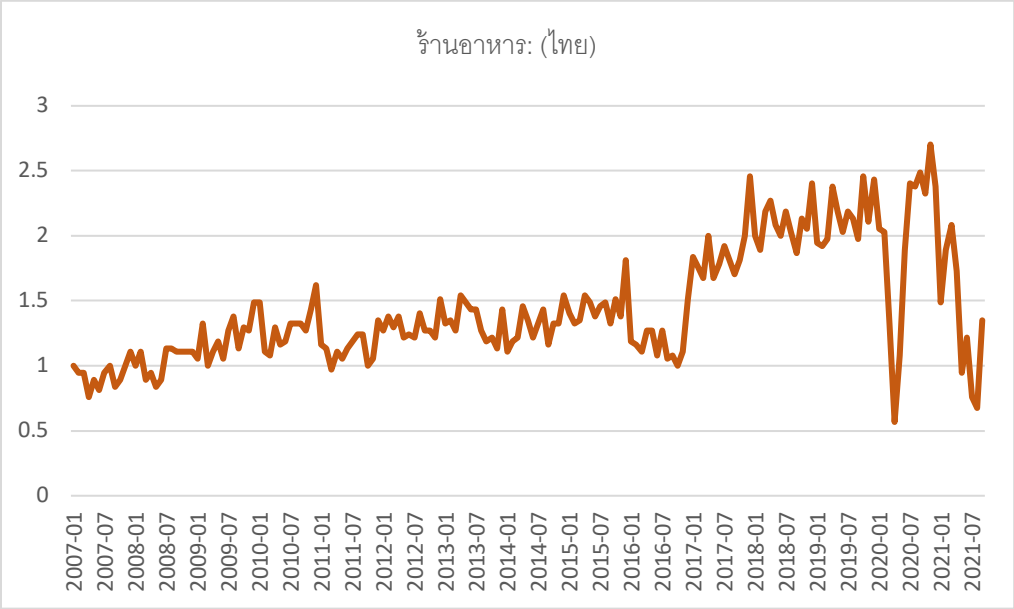


Figure 7.4: The time series data of the standardized google trend "Restaurant (Thai)" keyword



Appendix 2: Tables

Table 1: Forward and Backward Multiplier in year 2000, 2005, and 2011 in Thailand

SUMMARY	Backward multiplier			Forward multiplier		
	2000	2005	2011	2000	2005	2011
Agriculture, Hunting, Forestry and Fishing	1.56205293	1.64692688	4.14638938	2.73197297	3.0154375	5.75731672
Mining and Quarrying	1.50440324	1.61457073	1.29776503	2.43177691	2.64246335	4.08630694
Food, Beverages and Tobacco	2.09645836	2.18744252	3.92877438	2.12035264	2.14962877	4.68875538
Textiles and Textile Products	2.26825418	2.38445949	1.8670576	2.12416334	2.06910925	1.48630144
Leather, Leather and Footwear	1.8477715	2.06358498	1.52751918	1.13721913	1.12892668	1.105936
Wood and Products of Wood and Cork	1.836348	2.0807469	2.82823371	1.24424021	1.19399034	1.18049042
Pulp, Paper, Paper , Printing and Publishing	1.79798348	1.97400413	3.44131341	1.995477	1.85780793	2.03643076
Coke, Refined Petroleum and Nuclear Fuel	1.43125913	1.47999904	2.50838862	2.91809408	4.10544243	4.17502103
Chemicals and Chemical Products	1.94325699	1.95900018	2.86262526	2.25222179	2.22810337	4.02824923
Rubber and Plastics	2.15642721	2.36086512	3.37195346	1.61021603	1.56992092	2.95072644
Other Non-Metallic Mineral	1.86290899	2.09566815	2.12289723	1.41210912	1.53040794	1.54825262
Basic Metals and Fabricated Metal	1.73512151	2.20720079	2.6270631	1.69398391	2.29303735	3.16307991
Machinery, Nec	1.93495234	2.14476083	2.65569713	1.43497302	1.82339025	2.04328341
Electrical and Optical Equipment	1.94725191	2.12703931	4.10614084	1.97487978	2.10272343	3.5497606
Transport Equipment	2.02839995	2.23418145	2.6001837	2.01553973	1.95305903	1.91791898
Manufacturing, Nec; Recycling	1.86708802	1.97917092	2.3091386	1.44876271	1.49375831	1.40575674
Electricity, Gas and Water Supply	1.75932046	1.94085682	2.72887199	3.04227966	3.57234152	3.39041709
Construction	2.09246166	2.38056414	2.76360894	1.03315816	1.07112543	1.18151879
Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	0	0	1.97808764	0	0	1.54999155
Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	1.32866191	1.38549541	2.65426363	3.00461458	3.17406821	3.12647372
Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	1.28191168	1.3402603	1.2287192	2.39911833	2.53223725	2.73675384
Hotels and Restaurants	1.98250951	2.11154424	2.58745077	1.37914008	1.43493457	1.57385817
Inland Transport	2.18075925	2.26637367	2.60391664	1.76000109	1.81528061	2.12666162
Water Transport	1.65808117	1.89387236	1.80476295	1.16346697	1.1639313	1.325503
Air Transport	2.20477623	2.19987559	2.68085896	1.75664456	1.63234134	1.77647234
Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	1.74491436	1.82902744	2.07705129	1.14754397	1.28677048	1.35368724
Post and Telecommunications	1.47792362	1.74004056	2.04366335	1.71132314	2.08821106	1.97742147
Financial Intermediation	1.37325043	1.53770301	2.54626413	2.10561536	2.73964746	4.81255353
Real Estate Activities	1.15918674	1.25876239	1.17960035	1.18847518	1.24274693	1.32164774
Renting of M&Eq and Other Business Activities	2.05642904	2.25570335	2.9249167	1.82672724	2.06180682	4.3239811
Public Admin and Defence; Compulsory Social Security	1	1.06331283	1	1	1.00746766	1
Education	1.27118369	1.40840164	1.40451066	1	1	1
Health and Social Work	1.61506418	1.74538495	1.61531168	1.0288461	1.09017231	1.11832455
Other Community, Social and Personal Services	1.80062874	1.94194928	2.30295282	1.86418246	2.17223372	2.19887263
Private Households with Employed Persons	2.50701045	2.70361993	2.11935175	1.35689159	1.2998458	1.42757904

Table 2: Summary of the OLS regression

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.74540404
R Square	0.55562718
Adjusted R Square	0.54529293
Standard Error	0.26470597
Observations	177

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	15.0692591	3.76731478	53.7655938	2.4806E-29
Residual	172	12.0519109	0.07006925		
Total	176	27.12117			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.04341222	0.15258339	0.2845147	0.77635822	-0.2577648	0.34458927	-0.2577648	0.34458927
X1	0.08013361	0.02904487	2.75895958	0.00642633	0.02280334	0.13746388	0.02280334	0.13746388
X2	1.22400488	0.17440749	7.01807525	4.9701E-11	0.87975028	1.56825948	0.87975028	1.56825948
X3	0.2983589	0.0327544	9.10897213	2.0854E-16	0.23370656	0.36301123	0.23370656	0.36301123
X4	-0.259905	0.082134	-3.1644026	0.00183799	-0.4220254	-0.0977847	-0.4220254	-0.0977847