

European Journal of Economics and Management Sciences

Nº 2 2021

European Journal of Economics and Management Sciences

Scientific journal

№2 2021

ISSN 2310-5690

Editor-in-chief Bersirova Saida Halidovna, Russia, Ph.D. of Economics

International editorial board

Adieva Aynura Abduzhalalovna, Kyrgyzstan, Doctor of Economics
Biró Róbert, Hungary, Doctor of Economics
Blahun Ivan Semenovich, Ukraine, Doctor of Economics
Bogolib Tatiana Maksimovna, Ukraine, Doctor of Economics
Chechelashvili Maya Yurevna, Georgia, Doctor of Economics
Cherniavska Olena, Ukraine, Doctor of Economics
Ciobanu Marius, Romania, Doctor of Economics
Dovgal Elena Andreevna, Ukraine, Doctor of Economics
Ischuk Svetlana Alexeevna, Ukraine, Doctor of Economics
Guliyev Igbal Adil ogly, Russia, Doctor of Economics
George Chiladze, Georgia, Doctor of Economics, Doctor of Law
Karanina Elena Valerevna, Russia, Doctor of Economics
Kestutis Peleckis, Lithuania, Doctor of Economics
Khubaev Georgy Nikolaevich, Russia, Doctor of Economics
Khoutyz Zaur, Russia, Doctor of Economics
Kocherbaeva Aynura Anatolevna, Kyrgyzstan, Doctor of Economics
Kunditsky Alexander Alexandrovich, Ukraine, Doctor of Economics
Kurbanov Tohirdzhon Hakimovich, Russia, Doctor of Economics
Meymanov Bakyt Kattoevich, Kazakhstan, Doctor of Economics
Mizanbekova Salima Kaspiyeva, Kazakhstan, Doctor of Economics

Morozova Natalay Ivanovna, Russia, Doctor of Economics
Navruzoda Bakhtiyor, Tajikistan, Doctor of Economics
Olgerta Visi, Albania, Doctor of Economics
Osmonkulova Guldana, Kyrgyzstan, Doctor of Economics
Perova Margarita Borisovna, Russia, Doctor of Economics
Pshuk Bogdan Ivanovich, Ukraine, Doctor of Economics
Rodionov Alexandr Vladimirovich, Russia, Doctor of Economics
Salaev Sanatbek Komiljanovich, Uzbekistan, Doctor of Economics
Saif Ullamin, Pakistan, Doctor of Economics
Shamsiev Kamariddin Badrievich, Tajikistan, Doctor of Economics
Sharko Margarita, Ukraine, Doctor of Economics
Stahanov Dmitriy Viktorovich, Russia, Ph.D. of Economics
Yakovleva-Chernysheva Anna Yurevna, Russia, Doctor of Economics
Zelenskaya Tatiana Vasilevna, Russia, Doctor of Economics

Proofreading Kristin Theissen
Cover design Andreas Vogel
Additional design Stephan Friedman
Editorial office Premier Publishing s.r.o. Praha 8
Karlín, Lyčkovovo nám. 508/7, PSC 18600
E-mail: pub@ppublishing.org
Homepage: ppublishing.org

European Journal of Economics and Management Sciences is an international, German/English/Russian language, peer-reviewed journal. It is published bimonthly with circulation of 1000 copies.

The decisive criterion for accepting a manuscript for publication is scientific quality. All research articles published in this journal have undergone a rigorous peer review. Based on initial screening by the editors, each paper is anonymized and reviewed by at least two anonymous referees. Recommending the articles for publishing, the reviewers confirm that in their opinion the submitted article contains important or new scientific results.

Premier Publishing s.r.o. is not responsible for the stylistic content of the article. The responsibility for the stylistic content lies on an author of an article.

Instructions for authors

Full instructions for manuscript preparation and submission can be found through the Premier Publishing s.r.o. home page at: <http://ppublishing.org>.

Material disclaimer

The opinions expressed in the conference proceedings do not necessarily reflect those of the Premier Publishing s.r.o., the editor, the editorial board, or the organization to which the authors are affiliated.

Premier Publishing s.r.o. is not responsible for the stylistic content of the article. The responsibility for the stylistic content lies on an author of an article.

Included to the open access repositories:



The journal has the GIF impact factor .804 for 2019.

© Premier Publishing s.r.o.

All rights reserved; no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the Publisher.

Typeset in Berling by Ziegler Buchdruckerei, Linz, Austria.

Printed by Premier Publishing s.r.o., Vienna, Austria on acid-free paper.

Section 1. Marketing

<https://doi.org/10.29013/EJEMS-21-2-3-15>

Wu Yiheng,

The Summit Country Day School, Cincinnati, USA

E-mail: 3203414217@qq.com

BIG DATA PROJECT – BANK MARKETING CAMPAIGN

Abstract. When I first looked at the database, I found it different and enjoyable. It is not only a real-life situation I can analyze but also a good chance for myself to combine information I have learned in school with new information I learned through machine learning and form a path to the final result. There are phrases I did not understand or have not even heard of, but conquering them through and finishing four major machine models is beyond another level of achievement for me. I made lots of illustrations including graphs and tables in order to better represent how machine learning functions and how results are achieved.

Keywords: Bank Marketing Campaign, Machine Learning, Artificial Neural Networks, Logistic Regression, Support Vector Machine, Random Forest.

1. Introduction

The power of finance has long been inspirational to me. Understanding the usage and scope of money has been proven essential to this modern-day world. We, as customers, or as vendors, need to use money or other currency forms to transact benefits. Based on this public will, banks emerged in early history, along with other simple rules on saving and using money. Later, financial services such as deposits and loans emerged. According to the Oxford Dictionary, the modern explanation for the word “deposit” is “a sum of money placed or kept in a bank account, usually to gain interest”, whereas “loan” means anything that is borrowed and is typically expected to be paid back with interest. Moreover, starting as early as Medieval Ages in Great Britain, depositing valuables in banks was considered the safest way to save goods; time has passed and finally the Bank of Britain’s new identity as the “lender of last resort” was acknowledged. The

Bank of Britain not only guarantees the identity of every commercial bank in the UK but also allows anyone to borrow and save money in the bank.

Inflation is a general rise in the price of goods and services over some time. It can be affected in different ways through policies introduced by the government, economic programs launched by a tycoon, or the financial habits people become accustomed to. In general, inflation causes money to lose value. Thereby, if the consumer price index rises, we would realize that our money has devalued. When we look at the inflation rate in recent years, shown in figure 1, it is between 1%~3%. In order not to lose money, we turned to promotions offered by financial institutions. Usually, banks offer a higher rate of return for investments than simply saving money in our accounts, allowing us to maintain the growth in our financial value by beating inflation. A loan is the opposite of a deposit, it means a special form of debt lent by a corporation.

Typically, banks attract customers by having a higher interest rate than the inflation rate. One way to achieve that is by offering a time/term deposit account which is a type of deposit account held by the bank where the money is locked up for some set period, ranging from one month to a few years (Chen [1]). Different from a deposit, a term deposit generally means a fixed investment in the form of deposits

and cannot be taken out before the term ends (Chen [1]). By investigating the deposits and loans a person obtains, we can greatly understand the distribution of wealth in terms of gender, occupation, and other factors. It is exciting for me to investigate how other factors, including the results from past contacts and days between marketing campaigns, influence the acceptance of term deposits among customers contacted.

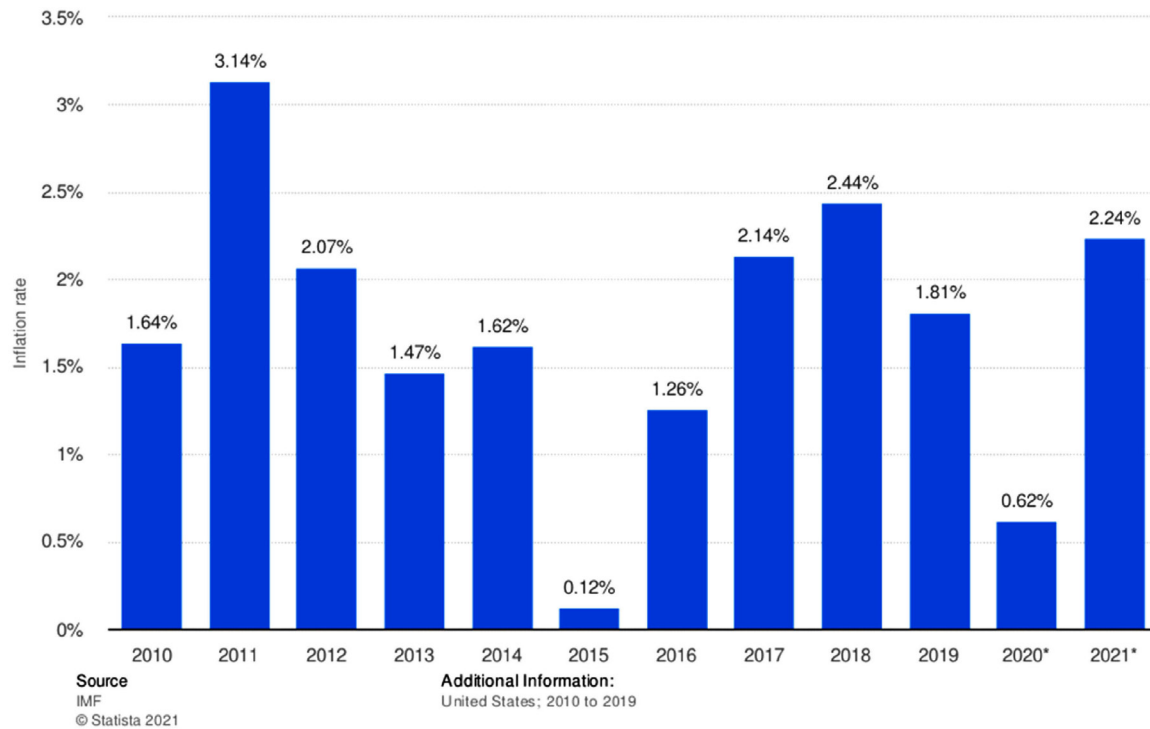


Figure 1. Projected annual inflation rate in the U.S. from 2010 to 2021. (Statista Research Department)

2. Hypothesis

As one's wealth builds up, he or she generally obtains more savings compared to others. Thereby, I would like to make the hypothesis that people with jobs that are related to business, science, and other white-collar jobs are more likely to subscribe to term deposits after the bank's marketing campaign.

3. Data and Methods

3.1. Data

I have done some research and found this tremendous dataset I adopted from a Portuguese banking institution under UC Irvine Machine Learning Repository. It has 16 predictor variables, as shown in table 1, and one outcome variable which is whether the client subscribed to the term deposit.

Table 1. – A list of variables in the dataset

Variable	Data type	Description
1	2	3
age	numeric	Age of the client
job	categorical	Type of job

1	2	3
marital	categorical	Marital status
education	categorical	Education level
default	binary	Has credit in default?
balance	numeric	Average yearly balance, in euros
housing	binary	Has a housing loan?
loan	binary	Has a personal loan?
contact	categorical	Contact communication type
day	numeric	Last contact day of the month
month	categorical	Last contact month of the year
duration	numeric	Last contact duration, in seconds
campaign	numeric	Number of contacts performed during this campaign and for this client
pdays	numeric	Number of days that passed by after the client was last contacted from a previous campaign
previous	numeric	Number of contacts performed before this campaign and for this client
poutcome	categorical	The outcome of the previous marketing campaign
Output variable	Data type	Description
y	binary	Has the client subscribed to a term deposit?

3.2 Exploratory Data analysis

To explore the data, A bar plot of the outcome variable with the counts of observations in each categorical bin is shown in figure 2. It shows that the dataset is unbalanced with about 89% of the outcome being “no” and 11% being “yes”. This can be addressed with various techniques during the machine learning phase. Figure 3 is a heatmap of the correlation matrix for numerical variables in the dataset. The color of the squares in the plot represents the magnitude of the correlation coefficient. No specific relationship had been found between different groups.

3.3 Data preprocessing

To prepare data for the machine learning models, texts need to be converted into numbers. This is done by One Hot Encoding after combining less frequent values for the columns with high cardinality like “job” and “month”. Figure 4 shows the histo-

grams of “job” and “month” before combining the less frequent values.

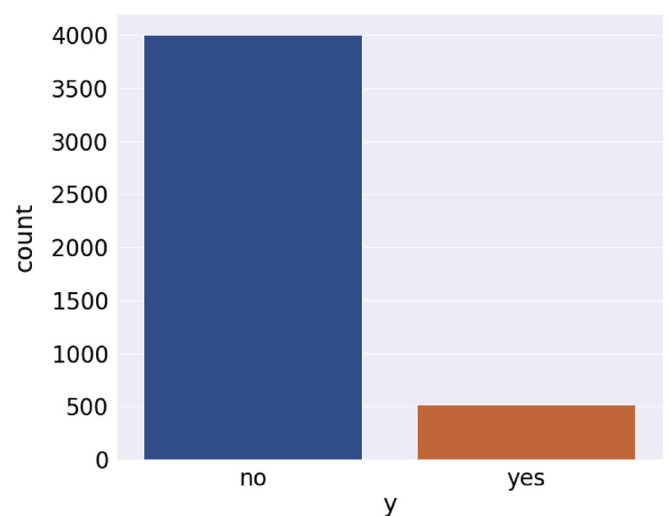


Figure 2. Countplot of the outcome variable “y”

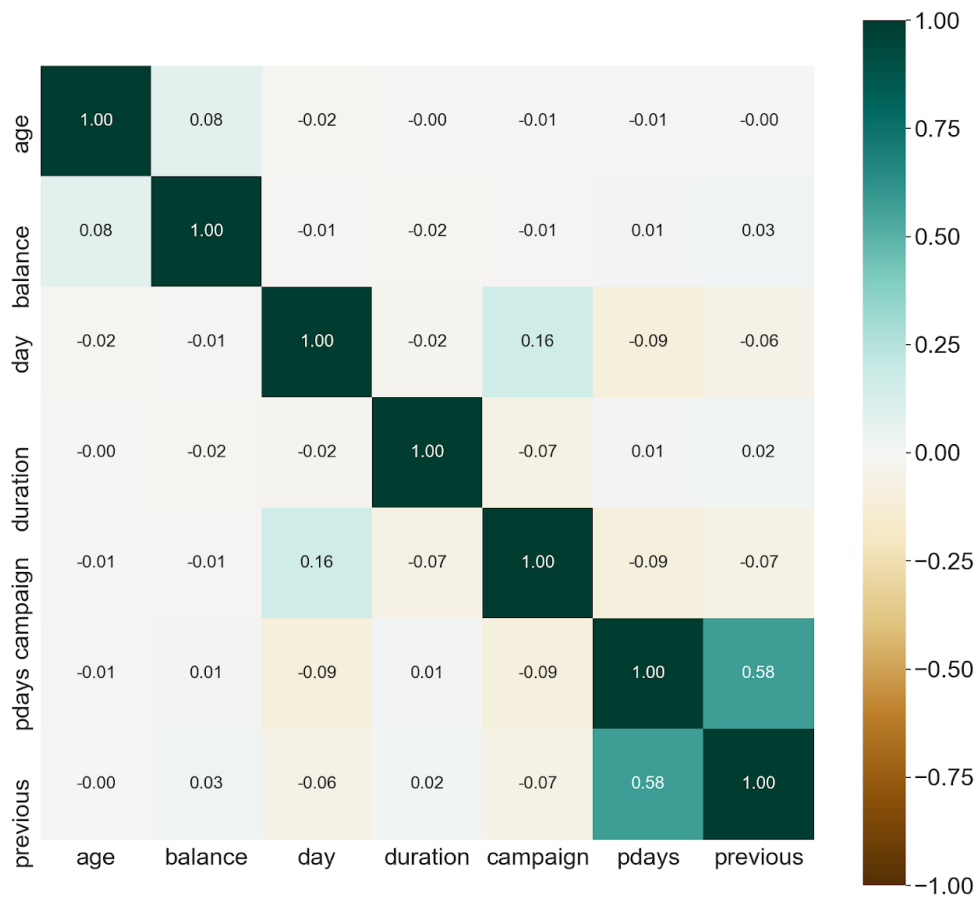


Figure 3. correlation heatmap of numerical features

Distribution Plot of job and month prior to combining



Figure 4. Distribution plot of variables "job" and "month" before combining less frequent values

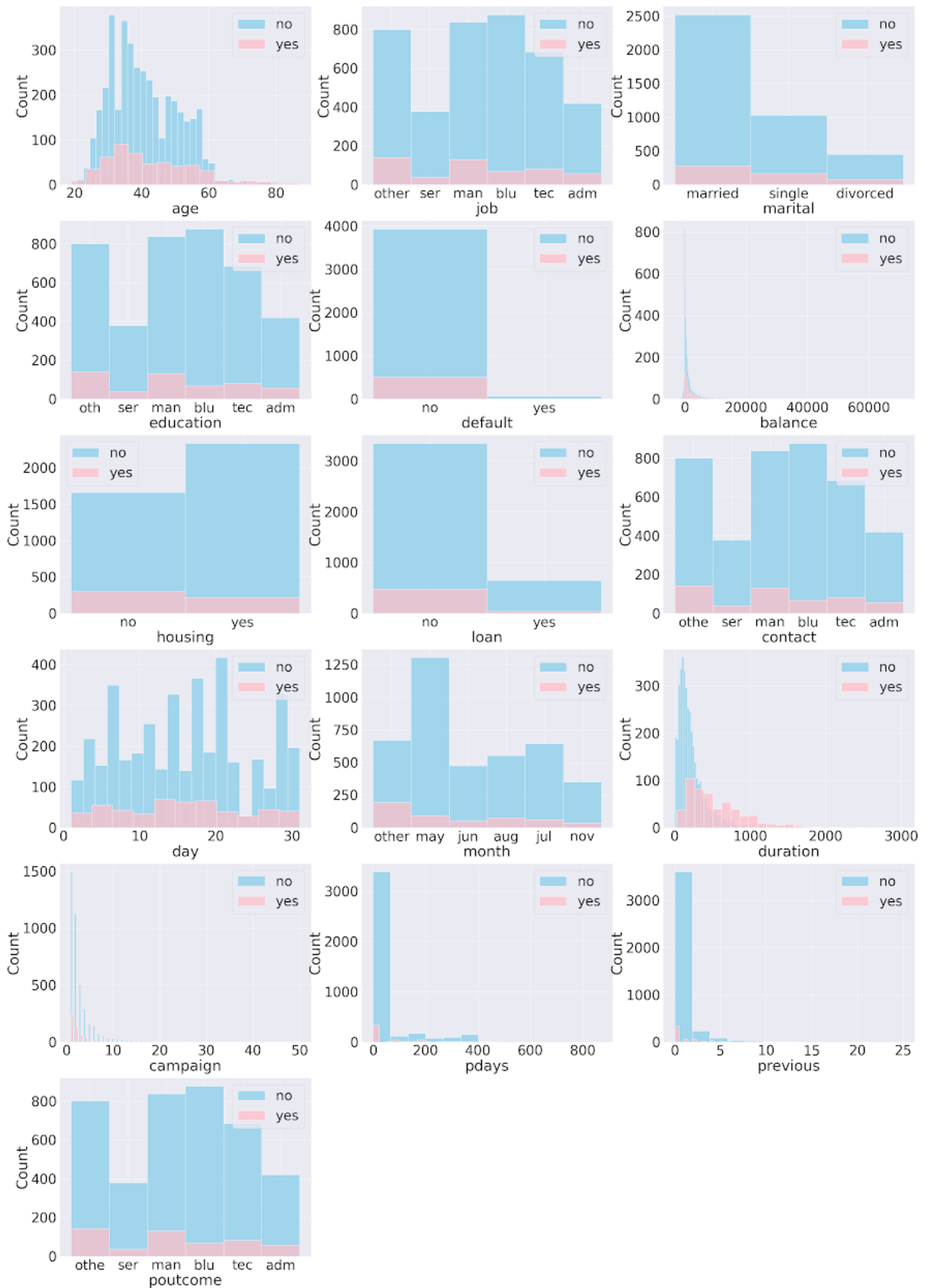


Figure 5. Distribution of each feature variable, colored by “y”

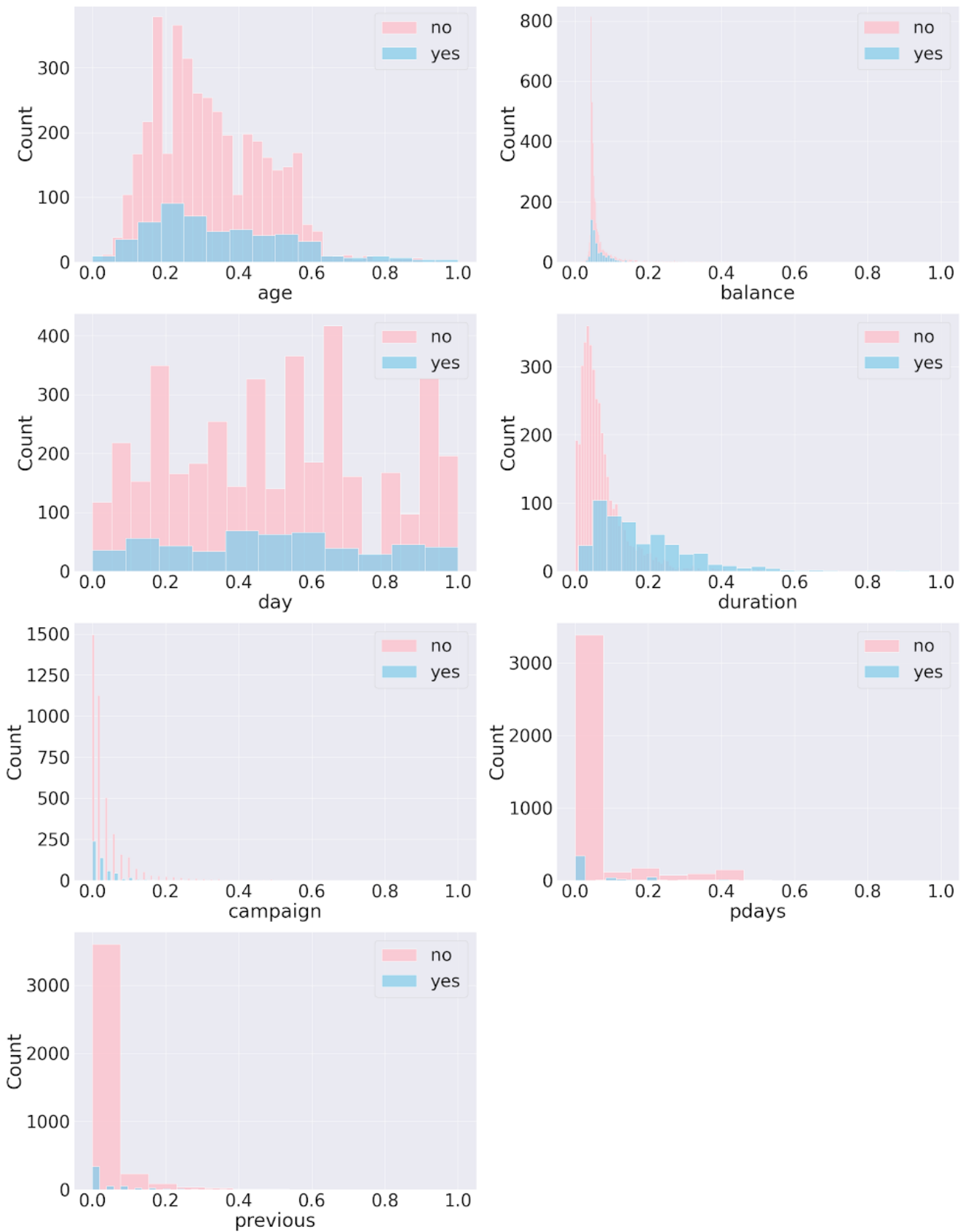


Figure 6. Distribution plot of numerical features after scaling

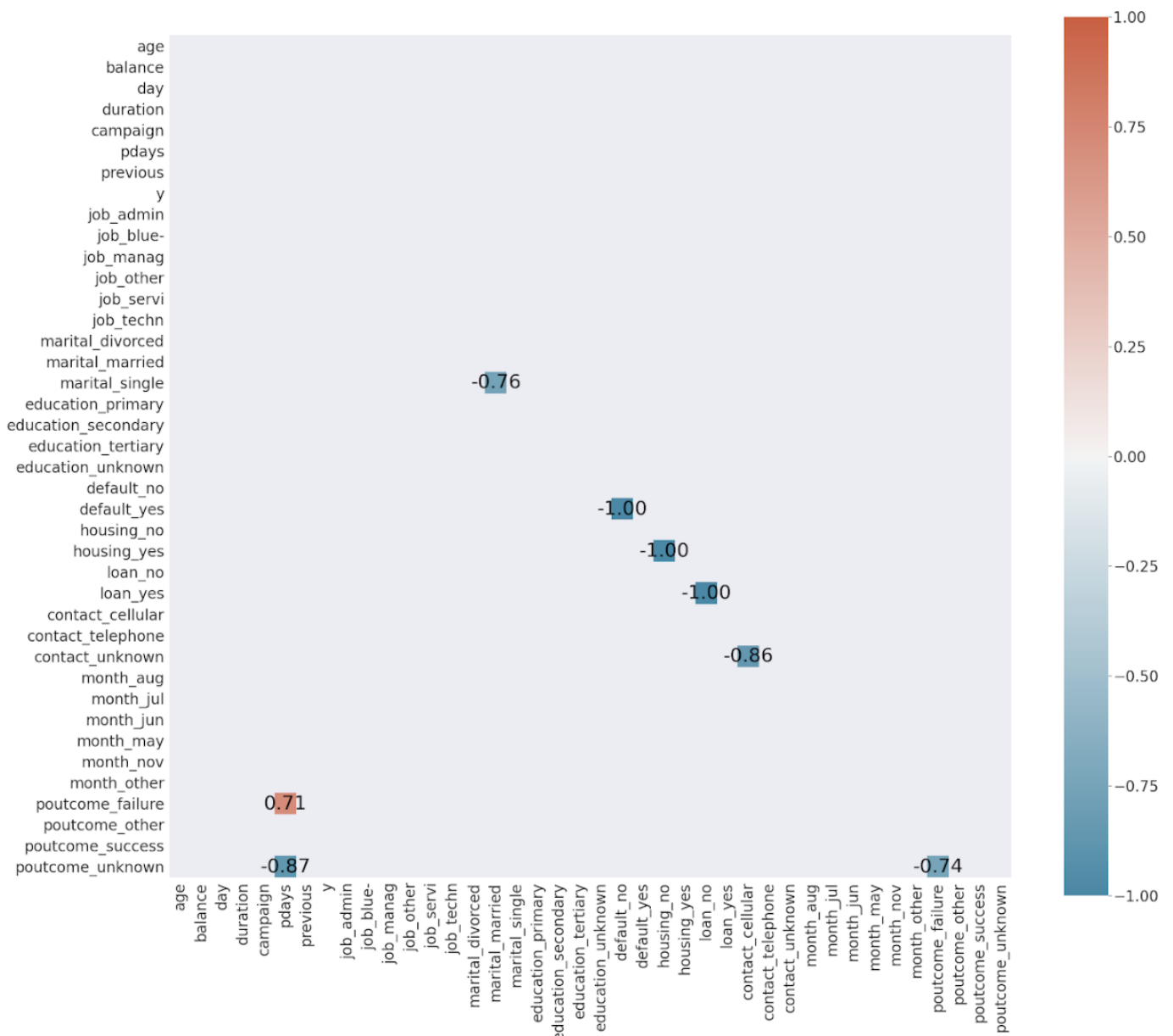


Figure 7. Correlation heatmap of all features after one-hot-encoding and scaling

The histograms of each feature variable, shown in (figure 5), were plotted using Seaborn's "histplot" function after combining less frequent values which are lumped into "other". In (figure 5), the X-axis represents the data variable is divided into a set of discrete bins, whereas the Y-axis represents the population falling within each bin which is shown through the height of the corresponding bar. The observations within each bin are also

color-coded by the outcome variable "y", blue bars represent the clients who didn't subscribe to a term deposit and pink bars represent the successful campaign cases.

One other thing in the preprocessing step is to put all the numerical data on the same scale. Figure 6 shows the histograms of numerical columns after scaling. In figure seven, visualizing by the heatmap, no strong correlation exists between categories.

4. Machine Learning Models

4.1 Artificial Neural Networks

The first model used was the artificial neural network model, which is a machine learning model inspired by the human brain. The model is implemented through Keras from Tensor Flow 2. Multi-layer perceptron (MLP) is the most common form of neural network. A sequential model is the easiest way to build an MLP classifier. Activation function Rectified Linear Unit (ReLU) for the hidden layers and Sigmoid function for output layer were used.

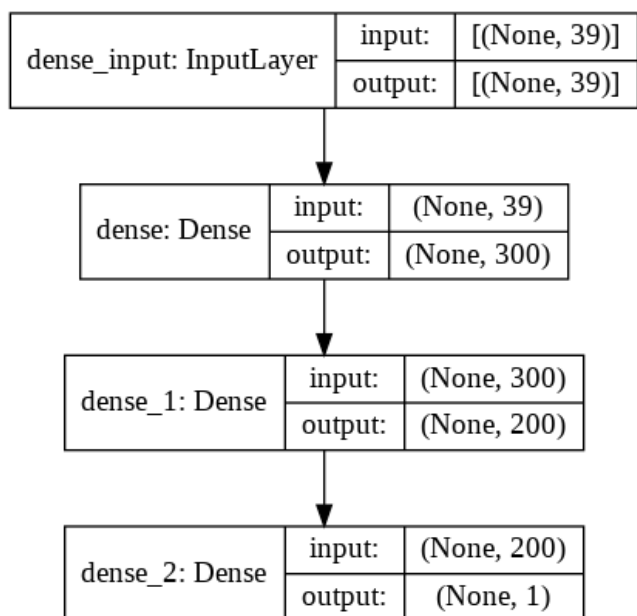


Figure 8. MLP model summary

After we created the sequential model, we used the Stochastic Gradient descent (SGD) optimizer and “binary cross-entropy” loss function to compile the model with accuracy as the metric. The model was trained for 30 epochs, each epoch means the data is being fed through the MLP once. In figure 8, we can see a general process of how the program trained the data, giving the input and generating the output. Figure 9 here we have an illustrative graph showing the neural network. Figure 10 shows the loss and accuracy of the train and validation set during training, where it reflects that the accuracy of the

program is improving. In figure 11, we get to look closer at the trend of increasing in accuracy and decreasing in loss during the process. It is reasonable that training accuracy is always higher than testing accuracy while training loss is always lower than the testing loss simply because testing shows what needs to be improved.

4.2 Logistic Regression

Regression is a type of math analysis that puts data together so that humans can analyze the trend or pattern of the relationship between variables. Logistic regression is, thereby, a machine-learning process that predicts binary information. Logistic regression can be used to categorize different classes of information or performed as the same use as a linear regression – predicting continuous outcome. There should be a dependent/target variable and a set of independent/feature variables.

In our ROC curve (receiver operating characteristic curve) for the logistic regression model, the X-axis is the false positive rate, which means the fraction of negatives that have been selected as positive incorrectly. On the Y-axis, we have the True positive rate, which measures the fraction of the initial positives which have been predicted correctly as positive by the classifier.

Table 2 shows the odds ratios (converted from the log-odds which are the coefficients provided by the logistic regression classifier) of all the feature variables. The impact size of factor “balance” can be expressed by its odds ratio:

$$\text{Odds subscribed/balance} = x + 1 \text{ Odds subscribed/balance} = x$$

When an odds ratio has a value above one, it means that the corresponding feature variable is positively associated with the target variable. For instance, in the table below, for balance we see an odds ratio of about 2.22. It means that we will see an increase of about 122 percent in purchasing term deposits when the balance of that customer’s account increased by 1.

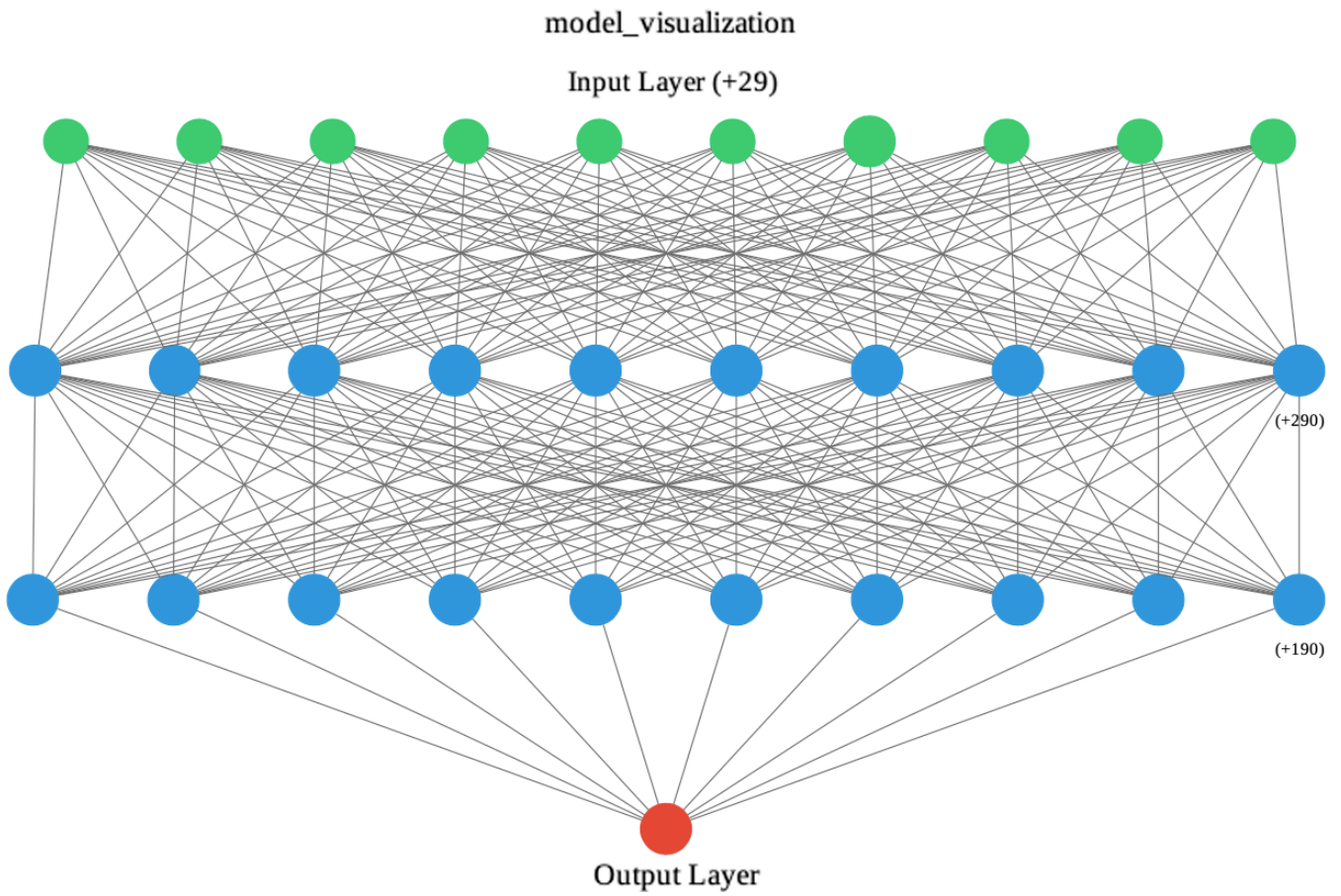


Figure 9. Artificial Neural Networks visualization

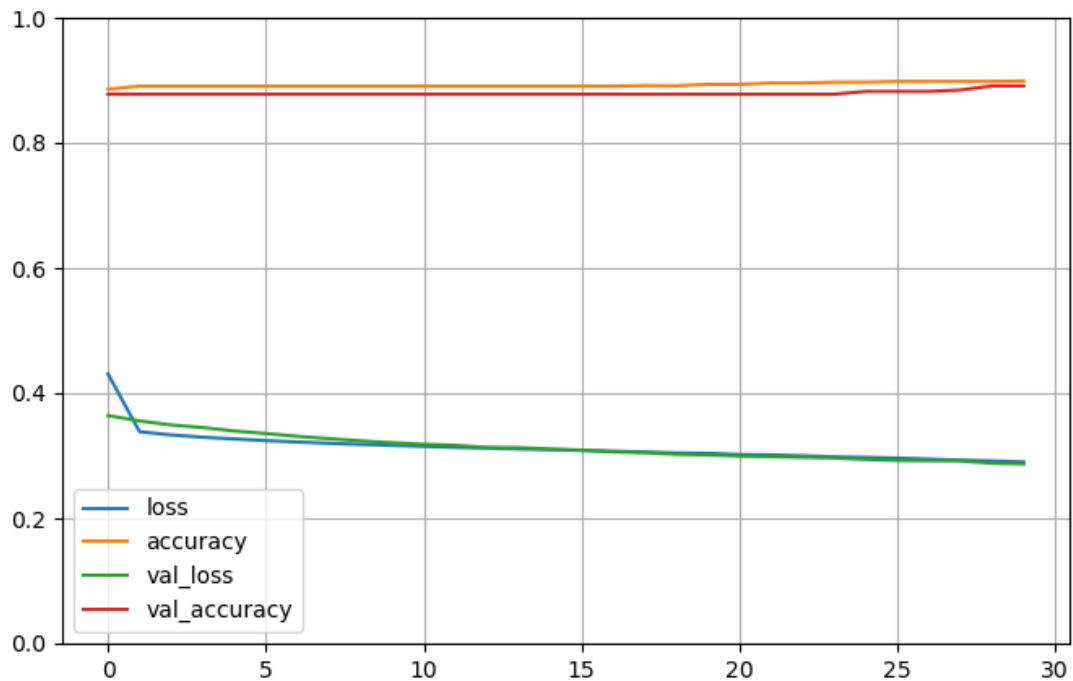


Figure 10. MLP train and validation set loss and accuracy plot during training

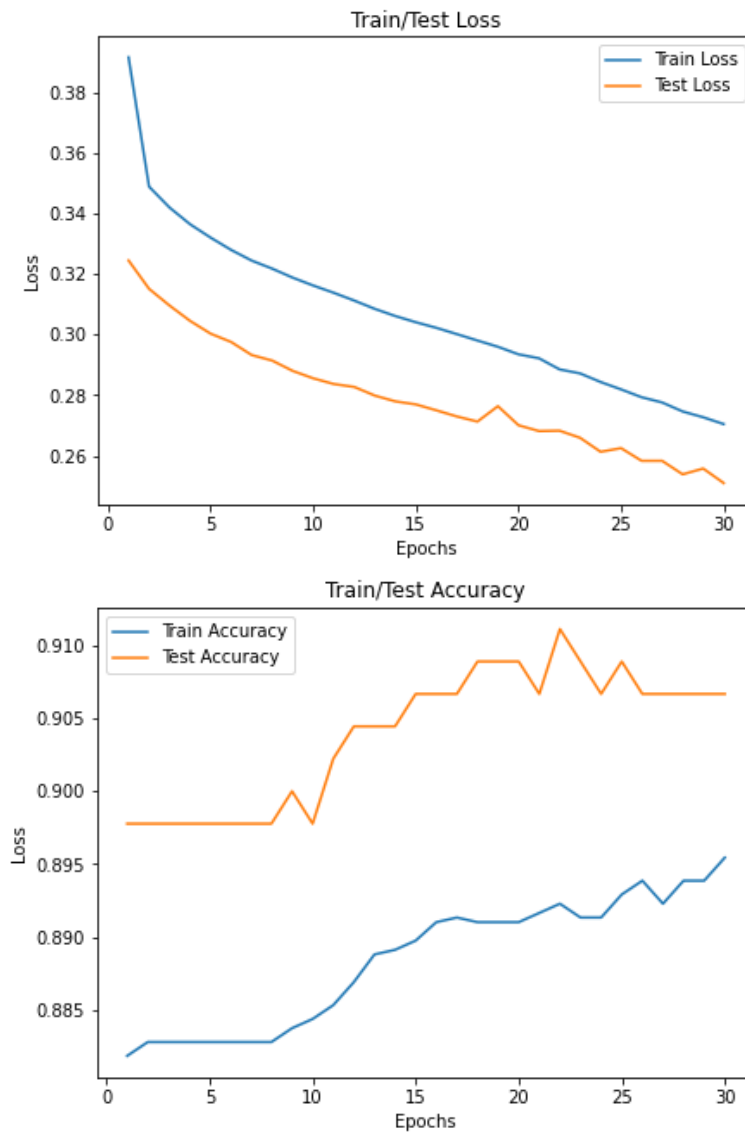


Figure 11. Train and Test set loss and accuracy of MLP

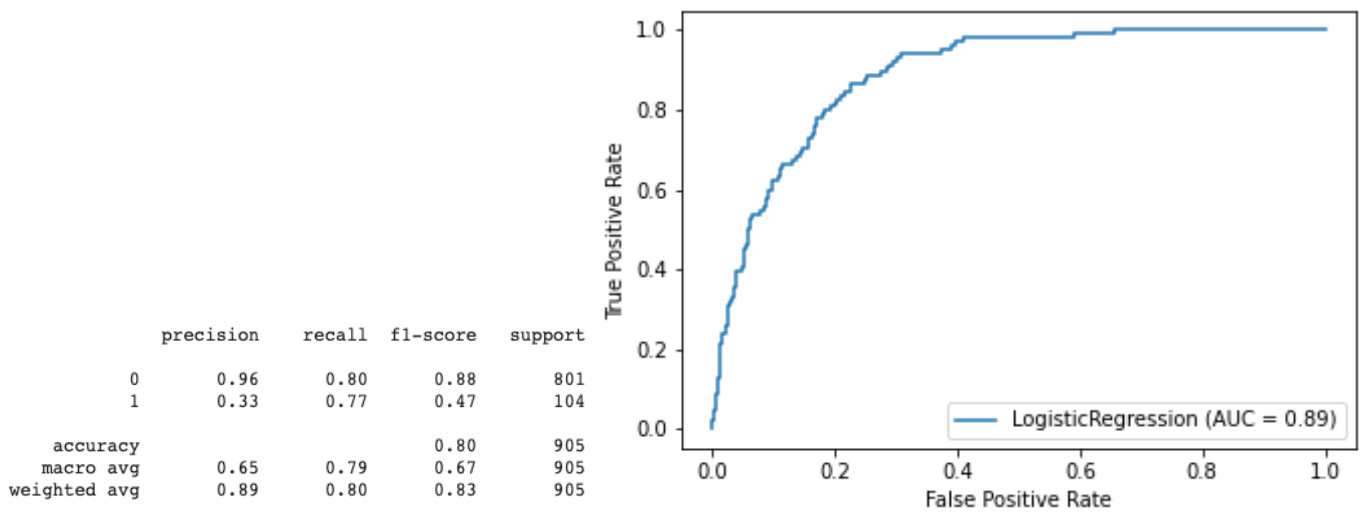


Figure 12. Logistic Regression Model classification report and ROC curve

Table 2. – Odds ratios of selected feature variables

Feature Variable	Odds ratio (≥ 1.5 or ≤ 0.5)
balance	2.22041722
duration	3.13496465e+05
pdays	6.09432521
previous	11.58689
month other	2.32546258
Job-related variables	Odds ratio
job adm	1.08849395
job blu	8.94624502e-01
job man	1.06234040
job other	1.02965993
job ser	9.70727022e-01
job tec	9.72869526e-01

4.3 Support Vector Machine

The first thing we do in an SVM is to find a hyperplane. What a hyperplane does is that it best separates the two different-class information, basi-

cally, a boundary. A hyperplane in a 3-D graph is a plane, while it is a line in a 2-D graph, as similarly, a dot in a line.

	precision	recall	f1-score	support
0	0.89	1.00	0.94	801
1	0.00	0.00	0.00	104
accuracy			0.89	905
macro avg	0.44	0.50	0.47	905
weighted avg	0.78	0.89	0.83	905

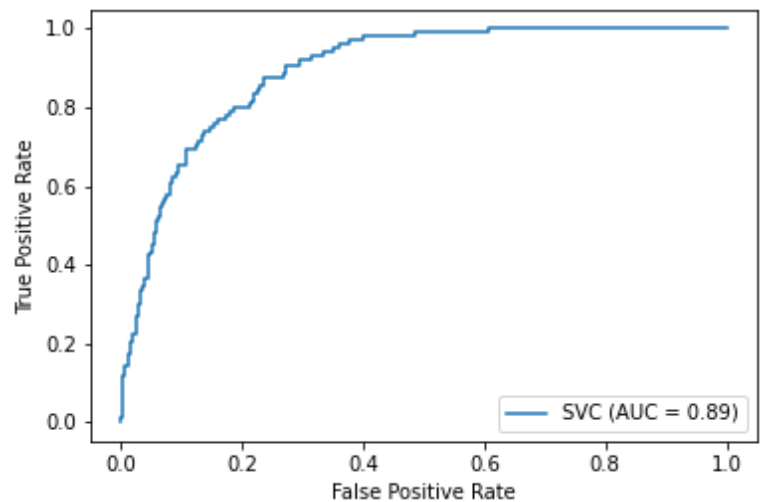


Figure 13. Support Vector Machine classification report and ROC curve

Our goal is to find a hyperplane that has the largest margin between the two different classes of data. Here, we reach the support Vectors. They are the points, or positions, that are closest to the hyperplane, and serve a great role in changing the hyperplane. The AUC (Area under the curve) above represents how well the machine separates different classes.

4.4 Random Forest

The random forest is a powerful yet illustrative technique that puts relative data together. Each small

section we see below in (figure 15) is called a node. There are two kinds of nodes in general, the decision nodes and the leaf nodes. We try to split each node with a specific type of method that allows us to eliminate overfitting and eventually binning outliers and non-linear data.

Decision trees help us with that. The decision tree is a model that processes the data based on the independent variables.

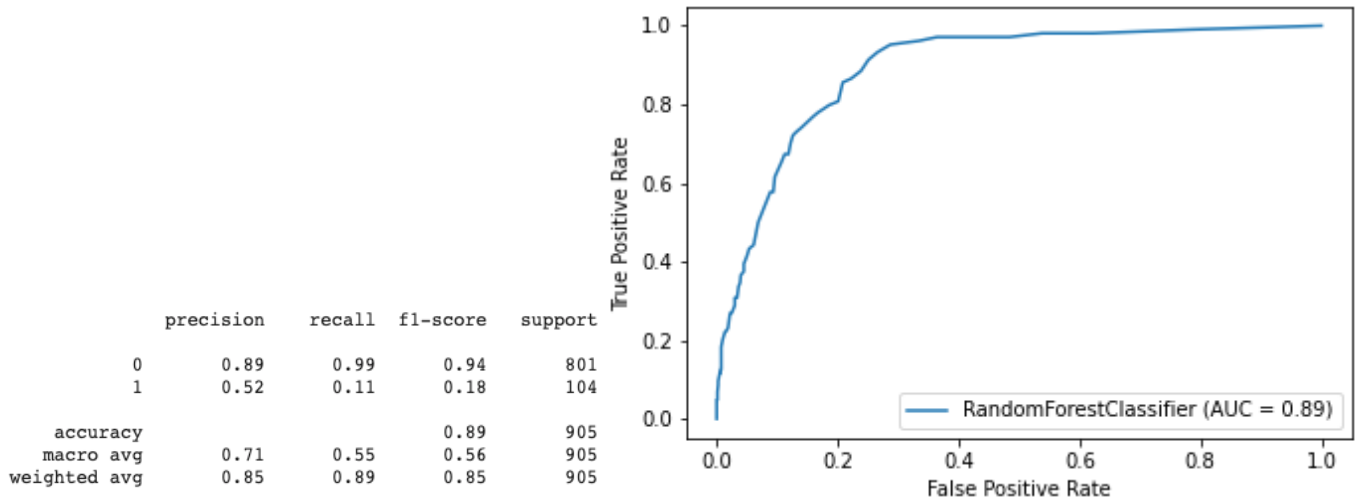


Figure 14. Random Forest Model classification report and ROC curve

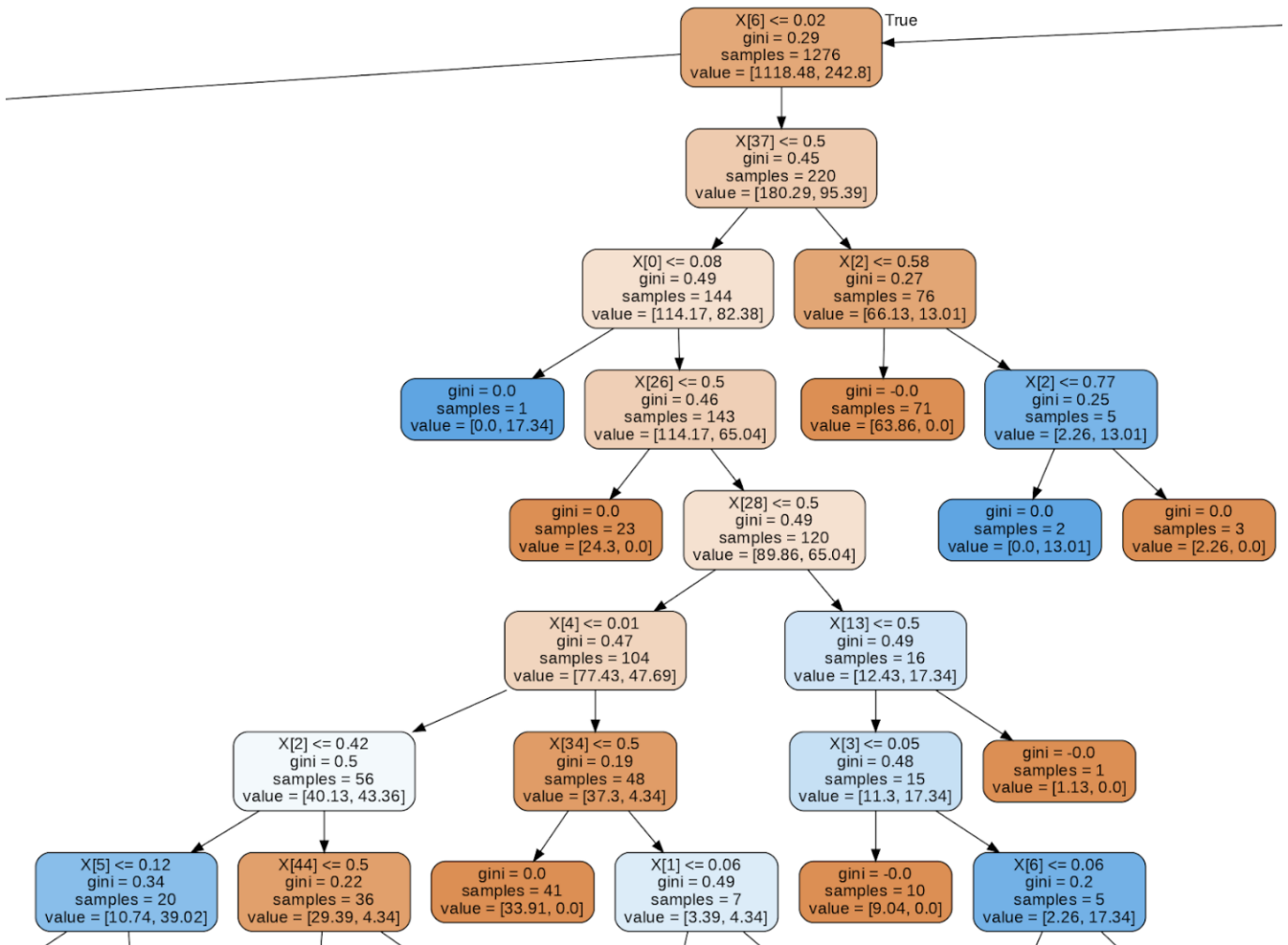


Figure 15. Part of the random forest visualization

In this case, the model will train each sample with questions such as: “What is your job?”

“What is your marital status?”. Thereby, we divide samples through different categories in each branch. Even-

tually, when we combine these decision trees together, we have the random forest model. One key term of this model is Gini Impurity, which is what we try to eliminate since it points to the wrong classification of nodes when splitting.

5. Conclusion

Upon all four models we have employed, and the previous data analysis, we found out that there is no direct relationship between what kind of jobs one has and the decision to buy term deposits as we previously hypothesized. For our neural network model, the curve is generally smooth, which means that the model gets more accurate at a slow but steady pace. Our process and result in logistic regression and support vector machines are quite similar. In both models, we saw a similar ROC curve, with the AUC 0.89, closer to 1 than to 0.5, which means that the models have relatively high-quality performance in distinguishing between different categories' effect on the project as a whole. We get a high precision

score in logistic regression, but with a relatively low accuracy of 0.8. On the other hand, though not that precise, Support Vector Machines proved to be more accurate. In the end, since our data is imbalanced between category 0 and 1, where category 0 has far more data and higher accuracy according to the f1 value, the macro average (calculates the unweighted mean accuracy per label or category) is far lower than the weighted average (calculates the weighted mean accuracy per label). However, both average values from the Random Forest model are higher than the other models. Therefore, random forest is one of the most successful models for this dataset.

6. Discussion

Data errors do exist in our data project. We can see that our source based on a bank in Portugal is a little outdated. As the old saying goes, a machine learning model can only predict what the data illustrates. We may have better predictions if we manage to get a more refined and recent dataset.

References:

1. Pettinger Tejvan. "Purpose of Banks." Economics Help. URL: <http://www.economicshelp.org/blog/glossary/banks/#:~:text=A%20bank%20is%20a%20financial,for%20a%20variety%20of%20loans>
2. Kagan Julia. "Loan." Investopedia, Investopedia, 1 Dec. 2020. URL: <http://www.investopedia.com/terms/l/loan.asp>
3. "What Is Logistic Regression?" Statistics Solutions, 9 Mar. 2020. URL: <http://www.statisticssolutions.com/what-is-logistic-regression>
4. Statista Research Department. "Projected annual inflation rate in the United States from 2010 to 2021." Statista. URL: <http://www.statista.com/statistics/244983/projected-inflation-rate-in-the-united-states/> Accessed 19 022021.
5. Statista Research Department. "Projected annual inflation rate in the United States from 2010 to 2021." Statista, URL: <https://www.statista.com/statistics/244983/projected-inflation-rate-in-the-united-states/> Accessed 19 022021.
6. Gandhi Rohith. "Introduction to Machine Learning Algorithms: Logistic Regression." Hacker Noon, 28 May 2018. URL: <http://hackernoon.com/introduction-to-machine-learning-algorithms-logistic-regression-cbdd82d81a36>
7. Giraud Aurélie. "Quick Intro to Random Forest." Medium, Towards Data Science, 31 Mar. 2020. URL: <http://towardsdatascience.com/quick-intro-to-random-forest-3cb5006868d8>.
8. Narkhede Sarang. "Understanding AUC – ROC Curve." Medium, Towards Data. Science, 14 Jan. 2021. URL: <http://towardsdatascience.com/understanding-auc-roc-curve-68b2303cc9c5>

Section 2. Mathematical and instrumental methods of economics

<https://doi.org/10.29013/EJEMS-21-2-16-28>

Jerry Xiang,
Betty Wang (Ivy Analytics Director, MS Management)
E-mail: jxiang23@stevensonschool.org

AMAZON FINANCIAL MODEL

Abstract. The balance sheet, the profit and loss (P&L) statement are two of the three financial statements companies issue regularly. Such statements provide an ongoing record of a company's financial condition and are used by creditors, market analysts and investors to evaluate a company's financial soundness and growth potential. The third financial statement is called the cash-flow statement [1].

The paper performs analysis and forecasting of future P&L for Amazon.com, Inc. [2], while adjusting Equity or adjusting Asset forecasting for balance sheet.

Based on the adjusting the forecasted rate of closing cash vs. cash asset, we can find some interesting conjecture for the Amazon equity buildup trend that could decrease the Equity buildup than others forecasted.

Keywords:

Chapter 1. Introduction

At the quarter-century mark, as July 3, 2019 the closing price is \$1,939, Amazon has 647,500 employees, occupies 288.4 million square feet of real estate, and accounts for nearly half of online retail in the United States. It operates in sectors ranging from janitorial services to defense contracting. And with great scale comes intense scrutiny: Amazon has come under fire from civil rights groups, presidential candidates, antitrust regulators and its own employees on issues ranging from facial recognition technology to its light federal income tax bill. Through it all, the company has maintained its intense focus on the customer –

sometimes, critics charge, to the detriment of everyone else [4].

Is this a good company to invest if people asked? As a professional, we cannot tell others witch company to put your money for investment without solid analysis. The only way we provide advice is to value the company. Here are evaluation points.

Section 1.1 Industry Analysis

We need to understand well the mechanics of the industry, who are the players, what is the value of their proposition. It is also important to acquire an idea what to be expected next in the industry? Is it a mature industry, a growing industry or, a cyclical business?

According to Tyco “Michael Porter” [3], in order to describe a given industry, five forces analysis need to be performed.

1. Threat of new entrants;
2. Threat of substitute;
3. Bargaining power of buyers;
4. Bargaining power of suppliers;
5. Rivalry among existing competitors.

Amazon is the leading U.S online retailer with a 23% market share more than its 12 major competitors including Wal-Mart and Staples (Bowman, 2015: Jan. 15). The market is highly concentrated with the domination of Amazon in terms of online e-commerce revenues.

Section 1.2 Company Analysis

When we have the proposition valuation of a company, what is its future? This determines the future cash flow of the company. We want to answer the below questions

1. Which are the company’s prospects ahead of business?
2. Is the company’s competitive formula a valid one?
3. Does the company have a sustainable competitive advantage?
4. Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis is the strategy a viable one.

According to an article published on Forbes (2017), the competitive advantage of any company in today’s world is considered the extent to which the company is adaptive. Keeping up with the trends is the most important factor in any company’s success. In case of Amazon, it has pretty much always worked on this strategy. Expanding even in the first year of its launch, it has been growing ever since and there’s no end to it. If there is anything trending in

terms of fashion, technology or innovation, it will most definitely be available on Amazon in all shapes, sizes, and prices.

Section 1.3 Production Positioning Analysis

Product positioning is a form of marketing that presents the benefits of your product to a particular target audience. Through market research and focus groups, marketers can determine which audience to target based on favorable responses to the product. Three types of company positions a company can choose.

Amazon segmentation, targeting and positioning involves a set of activities aimed at determining specific groups of people as customers and developing products and services attractive to this group.

Chapter 2. Financial Model

Section 2.1 Gathering financial information and preliminary analysis

The company’s financial information needs to be analyzed. We need to make sure the data from various years are consistent.

Many business events can pollute the quality of the data, like significant write-offs, extra-ordinary business, merger and acquisition. In this type of analysis, whether there are non-operational items, exclude them from valuation because they are valued separately.

Usually, it is very difficult to carry out the task without proper due diligence with access to the company’s management. Once financial statement is clean and ready to use, we need to calculate historical ratios for P&L, and balance sheet items. Sometime, history is good proxy for the future.

In this analysis, the Amazon tables of financials, balance sheet and cash flow are used directly from Yahoo.com [2].

Table 1. – Amazon P&L

USD in thousands	2016	2017	2018	2019
1	2	3	4	5
Revenue from sales and services	135.987.000	177.866.000	232.887.000	280.522.000
Other revenue				

<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Revenue	135.987.000	177.866.000	232.887.000	280.522.000
Cost of Revenue	(105.884.000)	(137.183.000)	(173.183.000)	(205.768.000)
Gross Margin	30.103.000	40.683.000	59.704.000	74.754.000
Operating Expenses	(17.611.000)	(24.551.000)	(31.685.000)	(37.389.000)
EBITDA	12.492.000	16.132.000	28.019.000	37.365.000
D&A	(8.306.000)	(12.026.000)	(15.598.000)	(22.824.000)
EBIT	4.186.000	4.106.000	12.421.000	14.541.000
Financial income/expenses	(484.000)	(848.000)	(1.417.000)	(1.600.000)
Extraordinary income	190.000	548.000	257.000	1.035.000
EBT	3.892.000	3.806.000	11.261.000	13.976.000
Taxes	(1.425.000)	(769.000)	(1.197.000)	(2.374.000)
Other Cost After Tax	(96.000)	(4.000)	9.000	(14.000)
Net Income	2.371.000	3.033.000	10.073.000	11.588.000
Area & Line Chart				
	FY16	FY17	FY18	FY19
Total Revenues	135.987.000	177.866.000	232.887.000	280.522.000
Gross Margin%	22.1%	22.9%	25.6%	26.6%

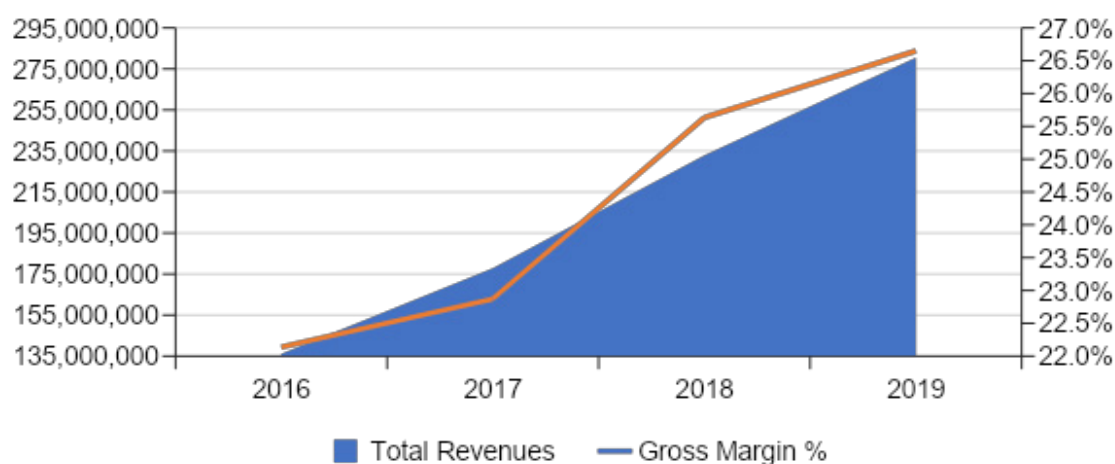


Figure 1. Amazon Revenue and Gross Margin. FY16-FY19 Revenues and Gross Margin %

The most important element in the whole predicting is the view for the top line of the business. Revenue development is the key. It is usually used as a driver for the rest of elements within the model. We can see that Amazon Revenue and Gross Margin% are almost linearly increase in past four years.

Section 2.2 Building Hypothesis and Scenarios

After all these preparation, hypothesis about the future of the business can be built up. Based on historical data, product positioning, and market research, analyst can build an idea of future revenues.

Depending on how sophisticated is the model, there could be some scenarios. Scenarios could approximate the outcomes of different events. For example,

Scenario 1: successful internationalization of the firm.

Scenario 2: un-successful internationalization of the firm, etc.

Scenario 3: non-internationalization

In Amazon Discount Cash Flow Model, we will simply to build a model containing three scenarios.

Table 2. – Scenarios

Case 1:	Optimistic case	Better than historical growth
Case 2:	Base case	Average historical growth
Case 3:	Worst case	Worse than historical growth

Section 2.3 P&L Analysis and Forecasting

Financial Modeling is all about providing a correct mathematical output of the work done previously. Usually a model should include sensitivity

analysis, help users to understand the influence of different parameters. The model should be flexible, precise, clear, and easy to understand by external users.

Table 3. – Amazon Year to Year Actual P&L

\$ in thousands	FY16 Actual	FY17 Actual	FY18 Actual	FY19 Actual
1	2	3	4	5
Revenues	135.987.000	177.866.000	232.887.000	280.522.000
y-o-y growth%		30.8%	30.9%	20.5%
Case 1:				
Case 2:				
Case 3:				
Cost of Revenue	(75.781.000)	(96.500.000)	(113.479.000)	(131.014.000)
% of revenues	-56%	-54%	-49%	-47%
Case 1				
Case 2				
Case 3				
Operating Expenses	(17.611.000)	(24.551.000)	(31.685.000)	(37.389.000)
% of revenues	-13.0%	-13.8%	-13.6%	-13.3%
Case 1				
Case 2				
Case 3				
D&A	(8.306.000)	(12.026.000)	(15.598.000)	(22.824.000)
% of revenues	-6.1%	-6.8%	-6.7%	-8.1%
Case 1				
Case 2				
Case 3				
Interest expense	(484.000)	(848.000)	(1.417.000)	(1.600.000)
y-o-y growth%	-0.4%	-0.5%	-0.6%	-0.6%
Case 1				
Case 2				
Case 3				
Extraordinary income	190.000	548.000	257.000	1.035.000
% of revenues	0.1%	0.3%	0.1%	0.4%
Case 1				
Case 2				
Case 3				

1	2	3	4	5
Operating taxes	(1.425.000)	(769.000)	(1.197.000)	(2.374.000)
% of EBIT	-34.0%	-18.7%	-9.6%	-16.3%
Case 1				
Case 2				
Case 3				
Other Cost After Tax	(96.000)	(4.000)	9.000	(14.000)
% of EBT	-2.5%	-0.1%	0.1%	-0.1%
Case 1				
Case 2				
Case 3				

Assuming financials, balance sheet and cash flow are clean and ready to use, we have the below forecast.

Table 4.– Amazon Year to Year Forecast P&L

\$ in thousands	FY20 Forecast	FY21 Forecast	FY22 Forecast	FY23 Forecast	FY24 Forecast
1	2	3	4	5	6
Revenues	353.457.720	445.356.727	561.149.476	707.048.340	890.880.909
y-o-y growth%	26.0%	26.0%	26.0%	26.0%	26.0%
Case 1:	31.0%	31.0%	31.0%	31.0%	31.0%
Case 2:	26.0%	26.0%	26.0%	26.0%	26.0%
Case 3:	11.0%	11.0%	11.0%	11.0%	11.0%
Cost of Revenue	(266.860.579)	(336.244.329)	(423.667.855)	(533.821.497)	(672.615.086)
% of revenues	-75.5%	-75.5%	-75.5%	-75.5%	-75.5%
Case 1	-73.0%	-73.0%	-73.0%	-73.0%	-73.0%
Case 2	-75.5%	-75.5%	-75.5%	-75.5%	-75.5%
Case 3	-78.0%	-78.0%	-78.0%	-78.0%	-78.0%
Operating Ex- penses	(47.363.334)	(59.677.801)	(75.194.030)	(94.744.478)	(119.378.042)
% of revenues	-13.4%	-13.4%	-13.4%	-13.4%	-13.4%
Case 1	-13.8%	-13.8%	-13.8%	-13.8%	-13.8%
Case 2	-13.4%	-13.4%	-13.4%	-13.4%	-13.4%
Case 3	-13.0%	-13.0%	-13.0%	-13.0%	-13.0%
D&A	(25.095.498)	(31.620.328)	(39.841.613)	(50.200.432)	(63.252.545)
% of revenues	-7.1%	-7.1%	-7.1%	-7.1%	-7.1%
Case 1	-6.1%	-6.1%	-6.1%	-6.1%	-6.1%
Case 2	-7.1%	-7.1%	-7.1%	-7.1%	-7.1%
Case 3	-8.1%	-8.1%	-8.1%	-8.1%	-8.1%
Interest expense	(1.409.915)	(1.402.865)	(1.395.851)	(1.388.872)	(1.381.927)
y-o-y growth%	-0.5%	-0.5%	-0.5%	-0.5%	-0.5%
Case 1	-0.4%	-0.4%	-0.4%	-0.4%	-0.4%
Case 2	-0.5%	-0.5%	-0.5%	-0.5%	-0.5%

1	2	3	4	5	6
Case 3	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%
Extraordinary income	1.037.588	1.040.181	1.042.782	1.045.389	1.048.002
% of revenues	0.3%	0.3%	0.3%	0.3%	0.3%
Case 1	0.1%	0.1%	0.1%	0.1%	0.1%
Case 2	0.3%	0.3%	0.3%	0.3%	0.3%
Case 3	0.4%	0.4%	0.4%	0.4%	0.4%
Operating taxes	(2.039.266)	(1.751.729)	(1.504.736)	(1.292.568)	(1.110.316)
% of EBIT	-14.1%	-14.1%	-14.1%	-14.1%	-14.1%
Case 1	-18.6%	-18.6%	-18.6%	-18.6%	-18.6%
Case 2	-14.1%	-14.1%	-14.1%	-14.1%	-14.1%
Case 3	-9.6%	-9.6%	-9.6%	-9.6%	-9.6%
Other Cost After Tax	(13.832)	(13.666)	(13.502)	(13.340)	(13.180)
% of EBT	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%
Case 1	-2.5%	-2.5%	-2.5%	-2.5%	-2.5%
Case 2	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%
Case 3	0.1%	0.1%	0.1%	0.1%	0.1%

Table 5. – Amazon Revenue and Gross Margin Forecast

	FY20 Forecast	FY21 Forecast	FY22 Forecast	FY23 Forecast	FY24 Forecast
Forecast Revenues	353.457.720	445.356.727	561.149.476	707.048.340	890.880.909
Forecast Gross Margin%	24.5%	24.5%	24.5%	24.5%	24.5%

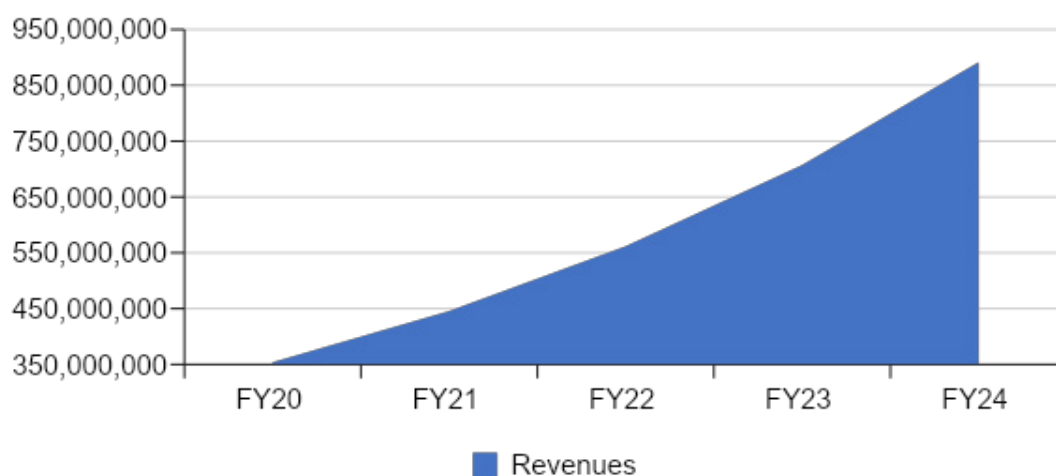


Figure 2. Amazon Revenue Forecast

Section 2.4 Balance Sheet Analysis and Forecasting

Table 6. – Amazon Balance Sheet

\$ in thousands	31Dec16 Actual	31Dec17 Actual	31Dec18 Actual	31Dec19 Actual
Net Receivables	8.339.000	13.164.000	16.677.000	20.816.000
<i>Days receivable</i>	22.1	26.6	25.8	26.7
PP&E	29.114.000	48.866.000	61.797.000	97.846.000
<i>as a% of revenue</i>	21.4%	27.5%	26.5%	34.9%
Inventory	11.461.000	16.047.000	17.174.000	20.497.000
<i>Days Inventory</i>	54.4	59.9	54.5	56.3
Other assets	8.507.000	22.247.000	25.750.000	31.068.000
<i>as a% of revenue</i>	6.3%	12.5%	11.1%	11.1%
Cash	25.981.000	30.986.000	41.250.000	55.021.000
<i>as a% of revenue</i>	19.1%	17.4%	17.7%	19.6%
Total Asset	83.402.000	131.310.000	162.648.000	225.248.000
Equity	19.285.000	27.709.000	43.549.000	62.060.000
	14.2%	15.6%	18.7%	22.1%
Accounts Payable	25.309.000	34.616.000	38.192.000	47.183.000
	120.2	129.1	121.2	129.6
Deferred revenues	4.768.000	5.097.000	6.536.000	8.190.000
	3.5%	2.9%	2.8%	2.9%
Long Term Debt	7.694.000	24.743.000	23.495.000	23.414.000
	5.7%	13.9%	10.1%	8.3%
Accrued liabilities	13.739.000	18.170.000	23.663.000	32.439.000
	10.1%	10.2%	10.2%	11.6%
Deferred taxes liabilities	1.787.000	1.994.000	2.386.000	–
	1.3%	1.1%	1.0%	0.0%
Other long-term liabilities	10.820.000	18.981.000	24.827.000	51.962.000
	8.0%	10.7%	10.7%	18.5%
Total Liabilities & Equity	83.402.000	131.310.000	162.648.000	225.248.000

Table 7. – Amazon Balance Sheet Forecast

\$ in thousands	31Dec20 Forecast	31Dec21 Forecast	31Dec22 Forecast	31Dec23 Forecast	31Dec24 Forecast
1	2	3	4	5	6
Net Receivables	26.228.160	33.047.482	41.639.827	52.466.182	66.107.389
<i>Days receivable</i>	26.7	26.7	26.7	26.7	26.7

1	2	3	4	5	6
PP&E	104.727.934	131.957.197	166.266.068	209.495.245	263.964.009
<i>as a% of revenue</i>	29.6%	29.6%	29.6%	29.6%	29.6%
Inventory	41.750.052	52.605.065	66.282.382	83.515.802	105.229.910
<i>Days Inventory</i>	56.3	56.3	56.3	56.3	56.3
Other assets	36.136.994	45.532.612	57.371.091	72.287.575	91.082.344
<i>as a% of revenue</i>	10.2%	10.2%	10.2%	10.2%	10.2%
Cash	65.259.541	82.227.022	103.606.047	130.543.620	164.484.961
<i>as a% of revenue</i>	18.5%	18.5%	18.5%	18.5%	18.5%
Total Asset	274.102.680	345.369.377	435.165.415	548.308.423	690.868.613
Equity	62.370.048	78.586.260	99.018.687	124.763.546	157.202.068
	17.6%	17.6%	17.6%	17.6%	17.6%
Accounts Payable	96.106.391	121.094.052	152.578.506	192.248.918	242.233.636
	129.6	129.6	129.6	129.6	129.6
Deferred revenues	14.033.543	17.682.264	22.279.653	28.072.363	35.371.177
	3.0%	3.0%	3.0%	3.0%	3.0%
Long Term Debt	33.582.101	42.313.447	53.314.944	67.176.829	84.642.805
	9.5%	9.5%	9.5%	9.5%	9.5%
Accrued liabilities	37.151.276	46.810.608	58.981.366	74.316.521	93.638.817
	10.5%	10.5%	10.5%	10.5%	10.5%
Deferred taxes li- abilities	3.057.141	3.851.997	4.853.517	6.115.431	7.705.443
	0.9%	0.9%	0.9%	0.9%	0.9%
Other long-term liabilities	42.248.818	53.233.511	67.074.224	84.513.522	106.487.037
	12.0%	12.0%	12.0%	12.0%	12.0%
Total Liabilities & Equity	288.549.318	363.572.140	458.100.897	577.207.130	727.280.983

It is clearly shows that the forecast for Total Asset and Total Equity & Liability are not balanced.

Table 8. – Amazon Forecast Check

Forecast	YR20	YR21	YR22	YR23	YR24
Total Asset	274.102.680	345.369.377	435.165.415	548.308.423	690.868.613
Total Liabilities & Equity	288.549.318	363.572.140	458.100.897	577.207.130	727.280.983
Difference	(14.446.637)	(18.202.763)	(22.935.482)	(28.898.707)	(36.412.371)

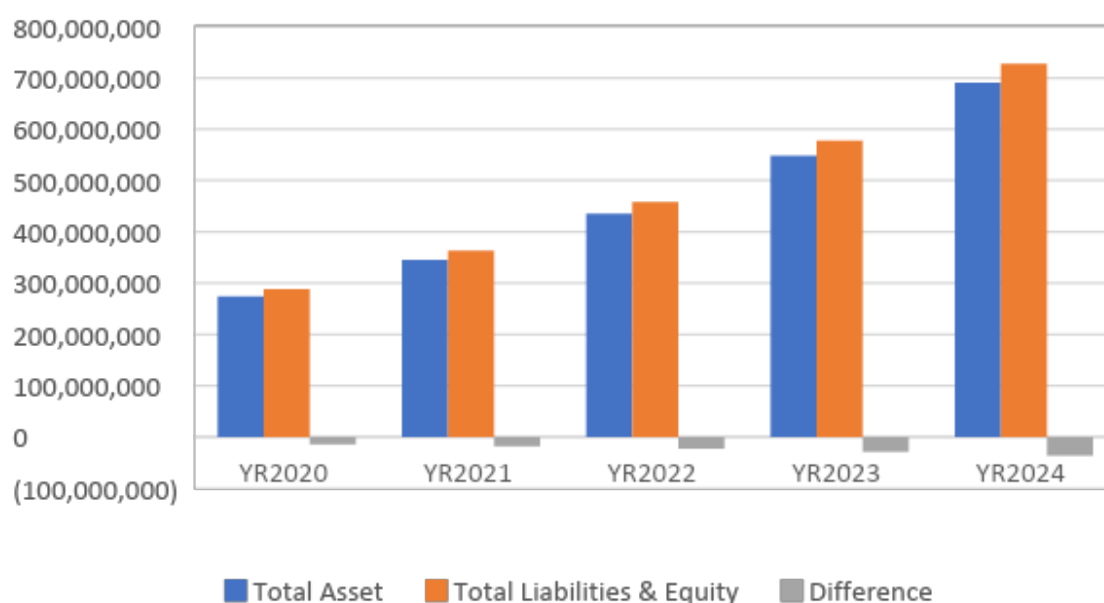


Figure 3. Amazon Forecast Check

It is interesting to discuss the below extreme hypothetical situation.

1. Assume that the Total Asset and Total Liabilities forecasting are accurate, i.e., the Equity needs to be adjusted. Then we would have

Table 9. – Amazon Equity Adjustment

Forecast	YR2020	YR2021	YR2022	YR2023	YR2024
Equity	62.370.047.52	78.586.259.87	99.018.687.44	124.763.546.18	157.202.068.18
Difference	(14.446.637.42)	(18.202.763.14)	(22.935.481.56)	(28.898.706.77)	(36.412.370.53)
Adjusted Equity	47.923.410	60.383.497	76.083.206	95.864.839	120.789.698
Adjust Rate	-23.2%	-23.2%	-23.2%	-23.2%	-23.2%

This would show some conjecture to the bottom line for the Amazon equity buildup trend when assuming every other trend keeps the same. It means Amazon could decrease the Equity buildup than forecasted as -23.2%

2. Assume that the Total Liabilities and Equity forecasting are accurate, i.e., the total Asset needs to be adjusted. Then we would have

Table 10. – Amazon Asset Adjustment

Forecast	YR2020	YR2021	YR2022	YR2023	YR2024
Total Asset	274.102.680.2	345.369.377.0	435.165.415.0	548.308.422.9	690.868.612.9
Difference	14.446.637.42	18.202.763.14	22.935.481.56	28.898.706.77	36.412.370.53
Adjusted Asset	288.549.318	363.572.140	458.100.897	577.207.130	727.280.983
Adjust Rate	5.3%	5.3%	5.3%	5.3%	5.3%

This would also show some conjecture to the top line for the Amazon Asset buildup trend when assuming every other trend keeps the same. It means

Amazon could increase more assets by adding more Net Receivables, PP&E, Inventory, Cash etc. than forecasted.

Section 2.5 Cash Flow Analysis and Forecasting

Cash flow is the money that is moving (flowing) in and out of your business in a month. Although it does seem sometimes that cash flow only goes one way – out of the business – it does flow both ways.

Cash is coming in from customers or clients who are buying your products or services. If customers

don't pay at the time of purchase, some of your cash flow is coming from collections of accounts receivable.

Cash is going out of your business in the form of payments for expenses, like rent or a mortgage, in monthly loan payments, and in payments for taxes and other accounts payable.

Amazon reported the below cash flow

Table 11. – Amazon Cash Flow

\$ in thousands	FY16 Actual	FY17 Actual	FY18 Actual	FY19 Actual
Cash flows from operating activities	16.443.000	18.434.000	30.723.000	38.514.000
Cash flows from investing activities	(9.876.000)	(27.819.000)	(12.369.000)	(24.281.000)
Cash flows from financing activities	(2.911.000)	9.860.000	(7.686.000)	(10.066.000)
Cash flows summary	3.656.000	475.000	10.668.000	4.167.000
Net change in cash	3.444.000	1.188.000	10.317.000	4.237.000
Opening cash	15.890.000	19.334.000	21.856.000	32.173.000
Closing cash	19.334.000	20.522.000	32.173.000	36.410.000
y-o-y growth%		6.1%	56.8%	13.2%

We can see the year to year growth% varies dramatically from 6.1% to 56.8%. When we take the me-

dium growth rate 13.2%, we would have the below forecasting

Table 12. – Amazon Closing Cash Forecasting

Forecasting	FY2020	FY2021	FY2022	FY2023	FY2024
Closing Cash	41.204.989	46.631.450	52.772.545	59.722.387	67.587.484

If we compare the closing cash with the Cash Asset from balance sheet, we have

Table 13. – Amazon Closing Cash Analysis

Actual	FY2016	FY2017	FY2018	FY2019
Closing cash	19.334.000	20.522.000	32.173.000	36.410.000
Closing Cash vs. Cash Asset	74.4%	66.2%	78.0%	66.2%
FY2020	FY2021	FY2022	FY2023	FY2024
41.204.988.6551	46.631.449.8782	52.772.544.9932	59.722.387.1943	67.587.483.8450
63.1%	56.7%	50.9%	45.7%	41.1%

It is apparent that the forecasted rate of closing cash vs. cash asset is linearly decreasing.

Let us discuss the below extreme hypothetical situation. Assume that the rate of closing cash vs.

cash asset is NOT linearly decreasing. But the rate would take average rate of the year 2016 to 2019, and then we would have two possible scenarios to adjust.

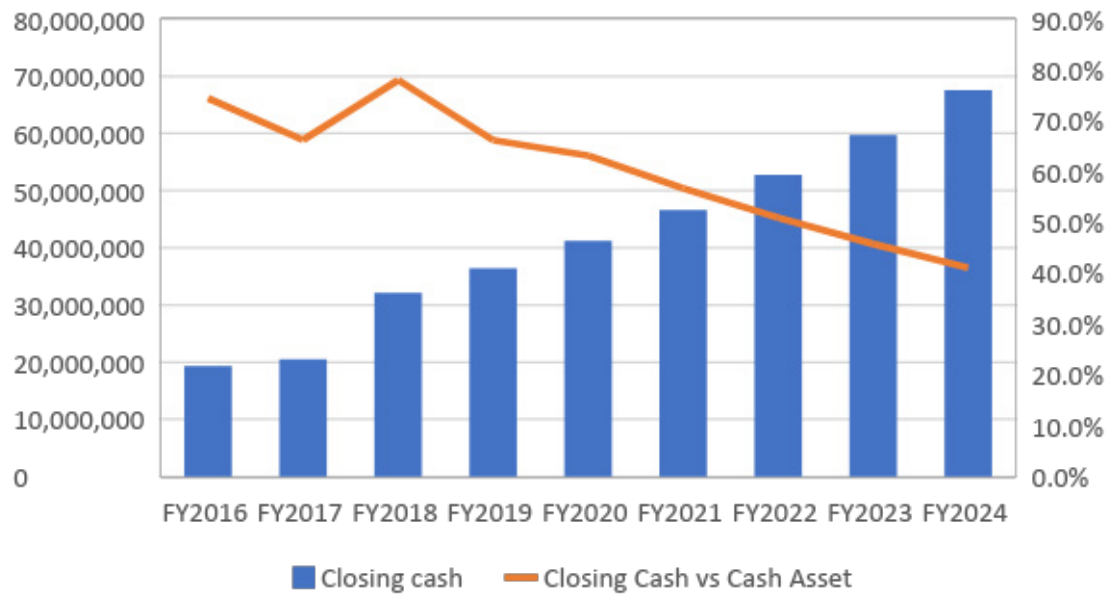


Figure 4. Amazon Closing Cash Analysis

1. Keep no change to the forecasting of cash asset, but adjust the closing cash flow, we would have.

Table 14. – Adjust the closing cash flow forecasting

Actual	FY2016	FY2017	FY2018	FY2019
Closing cash	19.334.000	20.522.000	32.173.000	36.410.000
Closing Cash vs. Cash Asset	74.4%	66.2%	78.0%	66.2%
FY2020	FY2021	FY2022	FY2023	FY2024
46,467,357.0480	58,548,869.8805	73,771,576.0495	92,952,185.8223	117,119,754.1361
71.2%	71.2%	71.2%	71.2%	71.2%

It is clearly shown that the forecasted closing cash flow will increase dramatically assuming rate is constant and without altering the forecasted cash asset.

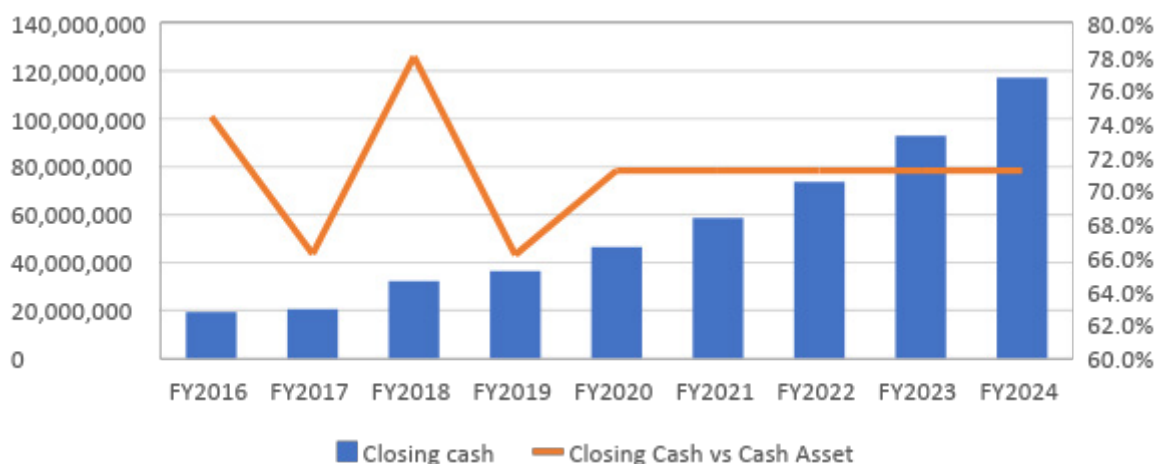


Figure 5. Adjust the closing cash flow forecasting

2. Keep the forecasting of closing cash, but adjust the cash asset, we would have

Table 15. – Adjust the cash asset forecasting

Actual	FY2016	FY2017	FY2018	FY2019
Closing cash	19.334.000	20.522.000	32.173.000	36.410.000
Closing Cash vs. Cash Asset	74.4%	66.2%	78.0%	66.2%
Cash Asset	25.981.000	30.986.000	41.250.000	55.021.000.
FY2020	FY2021	FY2022	FY2023	FY2024
41,204,989	46.631.450	52.772.545	59.722.387	67.587.484
71.2%	71.2%	71.2%	71.2%	71.2%
57,868,982	65.489.996	74.114.654	83.875.129	94.921.004

When we compare table 19 with Figure 20, it is clearly shown that the forecasted cash asset will

decrease dramatically assuming rate is constant and without altering forecasted of closing cash.

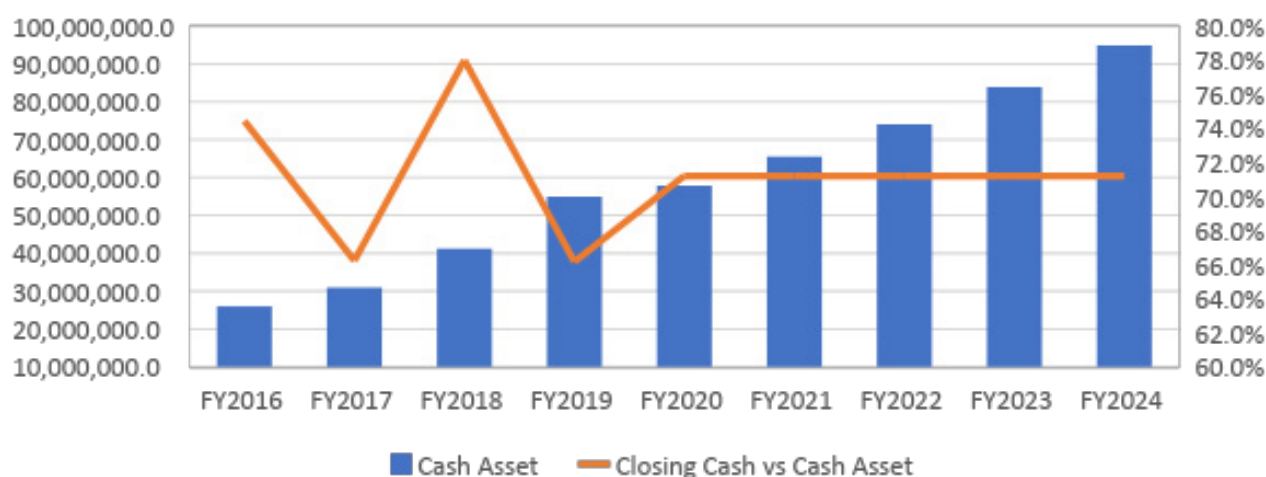


Figure 6. Adjust the cash asset forecasting

When we compare table 19 with Figure 20, it is clearly shown that the forecasted cash asset will decrease dramatically assuming rate is constant and without altering forecasted of closing cash.

Chapter 3. Conclusion

Amazon.com entered its linear growth period in revenue and gross margin. Based on its historical data of P&L, Balance Sheet, and Cash Flow, future 5 years of its financial numbers from the year 2020 to the year 2024 can be forecasted.

If the forecasting of our financial models is right, we will see Amazon’s equity will continue to grow linearly. Then its corresponding share price will continue to grow linearly.

However, the forecasting cannot generate balanced Assets and Equity, when assuming the company’s liability can be predicted, without any adjustment.

The unbalanced forecasting means financial conditions would not keep the same as before. The conditions should have a chance to keep a balanced business model.

There are many situations we can adjust the forecasted balance sheet depends on different conditions or scenarios. We have discussed several interesting scenarios that the adjustment can be done. Each adjustment can be dramatically changed the forecasting of Amazon’s assets and equities.

If some conditions were changed negatively, Amazon's equity could be dramatically away from the forecasting of many financial analysts.

We will take a close look to watch for any signs of changes in conditions.

References:

1. URL: <https://www.investopedia.com/ask/answers/121514/what-difference-between-pl-statement-and-balance-sheet.asp>
2. Amazon.com. Inc. (AMZN) at yahoo finance URL: <https://finance.yahoo.com/quote/AMZN/financials?p=AMZN>
3. URL: <https://www.businessballs.com/strategy-innovation/five-forces-model--michael-porter>
4. URL: <https://www.cnn.com/interactive/2018/10/business/amazon-history-timeline/index.html>

Section 3. Management

<https://doi.org/10.29013/EJEMS-21-2-29-31>

*Kavtidge Edward,
Doctor of Economics, Associate Professor
of Georgian Technical University
E-mail: e.kavtidge@gtu.ge*

STRATEGIC DIRECTIONS OF PERSONNEL MANAGEMENT DEVELOPMENT

Abstract. The article examines changes in corporate governance at the turn of the millennium. According to the author, these shifts are undoubtedly of a strategic nature, and their reasons are the globalization of the market and sectoral structure, the optimization of the workforce at enterprises, the orientation of the owners towards high incomes, rapid and constant organizational and technological changes. The author believes that the changes will affect not only the business as a whole but also the organization of work of personnel in individual corporations.

Keywords: personnel management, human resources, corporation, personnel, corporate strategy.

The HR strategy of the early 21st century includes two main elements: intention and direction.

1. Strategic intentions. In today's highly competitive environment, the HR specialist's mission is to increase the talent pool of the corporation to implement its business strategy. The HR manager becomes a kind of "skill calibrator", without whose participation it is impossible to develop and implement any of the company's strategies, and it is also impossible to correctly assess the results achieved. Ensuring the high competitiveness of the firm without the partnership with human capital is becoming an increasingly difficult task for corporate governance.

How to attract corporate, capable, hardworking, highly qualified, and talented people to the corporation? This is the challenge facing HR managers, who play the role of a catalyst in the corporation for multidimensional and long-term HR processes that provide the company with a competitive advantage due to the uniqueness of

human potential and a high level of responsibility of all employees.

Corporate culture increases responsibility, and human capabilities create competitive advantages. Therefore, the HR manager must solve two strategic tasks:

1) To create a competitive advantage for the company by increasing the level of responsibility of its employees, for which it uses corporate culture management tools. A strong corporate culture allows attracting and retaining talent, and the fruits of their labor provide the firm with a high reputation, attracting new clients and highly qualified employees. Updating and constant adaptation of the corporate culture to the dynamic conditions of the external environment are aimed at improving the quality of working conditions, providing feedback to employees and customers. This is often accompanied by seminars, forums, focus groups, round tables, and advertising campaigns. Involvement of employees in

the marketing activities of the corporation helps to increase their initiative and professional self-esteem;

2) Ensuring the competitive advantages of the company by increasing its human potential, which is carried out by fully ensuring the improvement of the professional competence of employees. As attractive as the corporate culture may be, the gap between the requirements of the global market and the potential of the organization can be bridged mainly by developing the professional skills and habits of all corporate personnel. The development of human skills, a high concentration of professional competence of employees are becoming a leitmotif not only for staff but also for line managers. At the same time, some companies include the issues of increasing the competence of personnel in any development strategy as an integral part, while others see this problem as an opportunity to implement a special initiative strategy, which is organically complemented by other competitive strategies of the corporation [1].

In any case, success depends on how carefully individual development plans are drawn up on the basis of diagnoses made by in-house specialists and line managers, which are designed to bridge the established gap between the growing professional requirements and the existing level of competence of each employee. These plans are based on the competency models developed for each position.

The following approaches can be used to develop models, each with its own strengths and weaknesses:

- Analysis of the activities of the most prominent workers (“stars”), allowing to reveal the secret of their skill, although the currently accepted model is too tied to this type of activity and has an overly complex architecture;
- Comparative analysis of many samples of workers’ activity makes it easy to generalize experience and build fairly simple models, but this is a very time-consuming task;
- Expert polls give fast and statistically reliable results, but their scope is usually limited;

- The combination of models borrowed from other fields of activity allows for the accumulation of the most advanced experience but does not always help within the organization.

Thus, when building competency models, it is necessary to combine existing approaches in order to adopt acceptable personnel management tools [2].

Competency models that describe the intellectual and business qualities of an employee, his interpersonal skills, allow us to consider the development of personnel in two dimensions:

- 1) Coordination of the quality of products and services with the organizational culture;
- 2) Acquisition of knowledge and skills necessary for successful work in a specialized professional field of activity.

The unity of these two dimensions is achieved through the practical interpretation of organizational culture, which is perceived as a social mechanism for the reproduction of experiences that are vital for the successful functioning and development of the organization.

2. Strategic directions. This component of the strategy explains how to achieve corporate strategic goals. But before choosing a path, it is important to have a clear understanding of the future of the organization. The structured vision of the future of the organization (the share of sales and market position, organizational structure, technologies of main and auxiliary production, management style, dominant organizational cultures, marketing policy, professional and personal characteristics of human resources) largely determine the strategic directions.

However, in conditions of mutual competition of highly qualified personnel, the realization of these accomplishments is a complex task. Human resources, if they do not want to be dealt with effectively, should be properly reorganized to function as bureaucratic structures: they owe the necessary distinctive types of marketing organizations. Therefore, the organization of the organizational culture of the personnel service (from the intensification of the bureaucratic

to the pre-employment culture) becomes a priority strategic development activity.

One of the priorities is the review of the institutional system of installation and stimulation, as well as the system of activities. Existing systems limit strategic decision-making in the areas of personnel management, representing the successful implementation of modern personnel strategies, as well as limiting the free maneuver of personnel managers [3].

The third priority – the reduction of what is associated with ineffective use of the potential of human resources, and also the expropriation of labor resources in corporations. In addition, co-workers themselves are responsible for the additional costs incurred by their traditional ability to organize their own work. Safeguarding effective interoperability with structurally subdivided corporations – certain guarantees are reduced.

Turn XXI century news from subsystems of administrative, routine assistive subsystems, supporting other “key” structural subdivisions of corporate personnel, into a trusted business partner of internal organizations and. It’s the basic strategic development of staff management. The success of such transformations depends on the creation of appropriate institutional infrastructure at many national levels. Ego basic elements can be:

- A single service, providing multi-profile and interdisciplinary support to the personnel service organization of different forms of

ownership in the acquisition of new staff technologies, with the necessary information for the relevant staff, including the relevant staff;

- Professional organization of staff workers, which receives official recognition and regulates the workload and service of the representatives of these professions, changing the environment, forming a research and development center, developing a strategic plan. strategy;
- All consulting centers and services, creating prerequisites for quick reorientation and training of line managers in correspondence with new staffing needs in the XXI century.

Regardless of that, as soon as you can quickly see the created institutional infrastructure, only a personal manager strives to become a key element of the personnel revolution of the future. Namely, the composition of professional professions or not depends on its readiness for professional development [4].

Considerable and constantly renewing knowledge of the current state of affairs, to which the corporation has dedicated its activity, becomes an important element of the professional competence of the staff specialist. Without this knowledge, it is impossible to develop and implement a viable personnel strategy, which’s a necessary step in a well-planned response to corporate business strategy.

References:

1. Orpen C. Market Conditions, Decentralization and managerial effectiveness in South-African and American Corporations // Management International review, 2008.– No. 1.
2. The Economist Intelligence Unit 2007. In search of clarity, Unravelling the complexities of executive decision-making. September, 2007.
3. Institute for the Future. Rapid Decision Making for Complex Issues: How Technologies of Cooperation Can help. August, 2005.
4. Maassen G. F. An International Comparison of Corporate Governance Models A Study on the Formal Independence and Convergence of One-tier and Two-tier Corporate Boards of Directors in the United States of America, the United Kingdom and the Netherlands. THIRD EDITION. Amsterdam, the Netherlands. 2002.

<https://doi.org/10.29013/EJEMS-21-2-32-34>

*Rostiashvili Tamar,
Doctor of Business Administration,
Professor of Georgian Technical University*

*Soselia Maya,
Doctor of Business Administration,
Professor of Georgian Technical University*

*Podiashvili David,
Doctoral student of Georgian Technical University
E-mail: maiko@mail.ru*

MODERN VALUES OF SERVICE MANAGEMENT AND BOUNDARIES OF THE SUBJECT AREA

Abstract. In the article the authors discuss the concept of „Service-Management“ which is becoming more and more commonly used term. According to the authors, the service – the management of a variety of disciplines to contribute. For example, service competition; long-term relationship marketing; dialogic (interactive) and internal marketing; partially employed by the seller and the Concept of service quality perception model; powers and the firm’s key to talk to people; operations carried out by the customer and the external environment, an approach aimed at both the front and rear of the line of work concept; operations management and service guarantees; orientation to a market economy and to encourage analysis of client base – it’s all just some of the notable mdgenelia. The authors believe that a truly interdisciplinary studies are still rare. We must hope that future research will broaden and deepen the perspective of service industries.

Keywords: Service-management, modern concepts, subject boundaries.

The concept of “service management” entered scientific and practical use in Sweden and England in the early 80 s. Since then, it has gradually become a generic term that reflects the general point of view of disciplines such as marketing, organization theory, human resource management, and operations management.

Service management as a perspective has emerged within at least 5 different disciplines, namely marketing, operational management, organization theory, human resource management, and service quality management. Finally, the sixth part of the educational process can be considered the activities of career managers and consultants, whose approach was initially greatly influenced by well-known service companies,

especially SAS (Scandinavian Airlines System), the hotel and travel company Club Med, professional services (Andersen Consulting), Experience in logistics management (Federal Express), retailers (Wal-Mart) and others. To these areas are also added individual writers of other disciplines (for example, the theory of the firm).

However, it should be noted that researchers interested in services often did not even try to change the old models and concepts of management. This is especially true of the so-called “Scandinavian school” that emerged in the mid-1970s when marketing was seen as an area inseparable from general management. Instead, a completely new approach to the problem of managing various aspects of service organizations

was taken and this was the beginning of what Richard Norman would later call “service management.”

We discuss the essence of service management, which includes:

1. Usefulness (value) that customers receive when using the organization’s independent services or in combination with real physical goods;
2. The process by which an organization (people, technology and physical resources, systems and customers) can produce and provide utility or quality;
3. The process by which an organization should be developed and managed in such a way as to achieve the desired utility or quality;
4. The organizational function by which this utility or quality is achieved, as well as the goals and interests of the parties involved (organizations, customers, other stakeholders).

Karl Albrecht offers a shorter explanation. He believes that some of the above definition is outdated, but it clearly shows closeness to some of the key aspects of service management in the proposed definition: “Service management is a total organizational approach that makes customer experience perceived quality of service and is the main driving force behind business operations.”

The content of the above explanations shows the basic idea and importance of service management. The 5 key aspects of the service management concept can be summarized from the following points of view:

1. In terms of overall management, which should cover all areas of decision making and not be limited to providing management principles for a specific function such as customer service;
2. From the point of view of client management or the stock market (not only from the point of view of the criteria of internal efficiency);
3. From a full point of view, emphasizing the importance of internal organizational and cross-functional cooperation;
4. From the point of view of quality management as an integral part of service management, and not a separate problem;

5. In terms of supporting existing internal staff development commitments, goals, and strategies.

Hence, from a methodological point of view, the study of service management should be associated with the search for a typical service enterprise with a typical, stable, repetitive internal organizational environment. This follows from the following principles:

- a) The repeatability of the environmental parameters of the tasks of service enterprises;
- b) Management decisions and strategies.

Discussion of general problems of service management, in our opinion, requires the connection of its conceptual vision with the mechanism and parameters of practical implementation, primarily through the development of design processes for service systems, procedures, strategies, and business plans. In this respect, the integration of actions between the management functions of the service enterprise (marketing, operations, and human resource management) is at the heart of the service management problem.

Service firms were the first to discover the problems caused by the old governance structure. Initially, marketers were interested in studying specific problems of the service. The development of new models, concepts, and tools based on the characteristics of services, their production, and delivery began in the 1970s. These issues have been the subject of doctoral dissertations and articles in the past, offering a description of the nature of the service and identifying problems in service marketing. The work of Wilson (1972) and Ratmel (1974) on professional services and the service sector pioneered the study of marketing problems in such firms.

Other areas of research on the nature and nature of customer relationships (operations, service provision, delivery processes) have been discussed separately by management researchers. Service quality has been proven to be created and perceived differently from traditional manufacturing models. However, researchers interested in services often did not even try to change old management models

and concepts in order to benefit from their services. Especially for the Scandinavian school, which dates back to the 1970s, when marketing as an area was not yet separated from general management. Instead, a completely new approach was taken to the problem of managing various aspects of service organizations, which Richard Norman (1982–1984) later called “service management.”

The long-term perspective typical of service management has a significant impact on marketing. This is clearly considered to be in line with current business trends (Kotler, 1992). Partnerships and networks, as well as strategic alliances formed in international business in many areas, are becoming increasingly important in domestic markets – this is the conclusion of Frederick Webster in his analysis of current business trends.

A uniform approach to service management has had several implications. In marketing, he clearly showed the need to promote the concept of a seller. Hamson introduced the concept of “part-time salespeople”, which was a great achievement for all of the firm’s non-marketing staff, who usually have no business knowledge, but care about customer contact and thus influence customer behavior. Thus, it was concluded that every worker is a seller in a given situ-

ation (Grenroes, 1982; and Hamson, 1990; see also Webster, 1998).

Output. The term “service management” is becoming more common, referring to an overall perspective. But the point of view itself arose much earlier than the term, entering the conceptual apparatus of such disciplines as marketing, organization theory, human resource management, and operations management.

Various disciplines have made specific contributions to service management. For example, service competition; long-term relationship marketing; internal marketing; Freelance provider concept and service quality perception model; service management system; the difference between high-contact and low-contact personnel; authority and attitude to people as to the main resource of the company; a customer-centric approach to operations and an outward-looking environment as a concept for support and support services; operational management and service guarantees; market economy orientation and customer base analysis are just some of the considerations. However, truly interdisciplinary research is still rare. We must hope that in the future such research work will further broaden and deepen the service prospects.

References:

1. Leonard A. Schlesinger, James I. Heskett. “The Service-driven Service Company”, 2018.– 71 p.
2. Albrecht Karl and Zemke Ron. *Service America*, Homewood, IL: Dow Johns-Irwin. 1985.– P. 31–47.
3. Chase R. B. Garvin D.A. *The Service Factory*, Harvard Business Review.– Vol. 67.– No. 4. 2009.– P. 91–69.
4. Bell Daniel. *The Coming of Post-industrial Society: A Venture in Social Forecasting*, Basic Books Inc.,– New-York. 2013.
5. Illeris S. Are service jobs as bad as theory says? Some empirical findings from Denmark. *The Service Industries Journal*,– 22(4). 2002.– P. 1–18. 10.1080/714005095
6. Haksever C., Render B. *Service Management: an Integrated Approach to Supply Chain Management and Operations* / Cengiz Haksever, Barry Render.– 1 Edition. 2013.

<https://doi.org/10.29013/EJEMS-21-2-35-38>

Khmiadashvili Nino,

Doctoral student of Georgian Technical University

E-mail: n.khmiadashvili@gtu.ge

KEY ASPECTS OF QUALITY MANAGEMENT IN THE HOTEL BUSINESS

Abstract. The article discusses quality as a fundamental factor in survival in the face of growing consumer demands and competition. According to the author, modern business strategy is based on quality control of products and services, which is the main tool of management of any organization today. The author describes quality management as a rather complex process that must be entirely customer and buyer-oriented, considering what quality is as one of the key factors of competitiveness. According to the author, the features of quality management play a crucial role in the hotel industry, as well as in the work of the hotel service.

Keywords: quality, management, competitiveness, hotel industry.

Introduction. There are many definitions of quality, which can be explained by the variety of quality categories themselves. But the International Organization for Standardization (ISO) sums up the many differences of opinion about quality: “Quality is the compliance with the existing or intended requirements of a product, process or system characteristics.”

1. Quality Management System

The Quality Management System (QMS) is a formal system and includes documentation of the structure, responsibilities, and processes required for effective quality management. The modern concept of quality management is based on five main stages:

1. Formation of a systematic approach to quality management (Taylor System-1905). At this point, the focus was on controlling product parameters and characteristics. Typically, inspections were carried out at the end of the production cycle and required the involvement of specially trained quality inspectors;

2. Statistical Quality Management (1924). The focus of the product was shifted to manufacturing processes, for which statistical methods and control maps were used;

3. The concept of total quality management TQM (1950). During this period, the focus of quality man-

agement is on improving the subsystems of the enterprise, such as production, management, procurement processes, personnel management, sales, etc. ;

4. Quality management based on ISO 9000 International Quality Management Standards (1970–1980);

5. Total Quality Management TQM (from 1989 to present), where quality is seen as meeting the needs of society, customers. The term “quality” in the narrow sense means the quality of products; by broad interpretation, it refers to the quality of work, services, information, subdivision, employees (engineer, manager, supervisor, worker), management system, company, goals and more.

Quality management poses many tasks for the entrepreneur, the achievement of which leads to the achievement of the desired level. While adhering to international standards is a voluntary initiative, every company strives to join it in order to consolidate positions in the market. The requirements for the effectiveness of quality management measures are given in the international standards ISO 9000, the recommendations of which are used both in the creation of the quality system and in the evaluation criteria. When concluding contracts, when the customer wants to check and evaluate how reliable the

supplier is, how stable he will be able to deliver quality goods, he uses the ISO 9000 recommendations.

At present, leadership in the field of quality is achieved through the quality solution of all the tasks of the company, the methodological and ideological basis of which is the TQM principles. However, the transition to ISO 9000 standards is the initial stage of TQM.

Renowned Japanese professor Kaoru Ishikawa argues that quality should be embedded in every project, in every process ... The essence of complex quality management lies in quality management when developing new types of products ... If a company follows the principle of “quality first”, then its profits will increase in the long run. If a company is focused on short-term profits, it will lose competitiveness in the international market and in the long-run future profits as well. Of course, this is easier said than done.

Quality of service – one of the most important indicators of the work of the hotel. Improving the quality of service is essential for the hotel business, the customer, and the national economy as a whole, for visitors. Providing high-quality services helps to increase their sales volume, enterprise profitability and increase the prestige of the hotel. Consumption of improved quality and high customer value services reduces customers’ ongoing costs and ensures that their needs are met. This implies the need for constant, purposeful accumulation of work by hotel enterprises to improve the quality of service.

Effective service quality management prioritizes the customer and hosts the enterprise, where they develop a comprehensive quality policy that includes social, economic, technical, legal aspects. Quality Improvement – An activity that is performed to improve the efficiency of activities and processes, to benefit the organization and the customer.

2. Hotel Service

Specific features of the hotel service are:

- Consumption of hotel services coincides with their production;

- The quality of hotel services can be assessed only in the process of consumption;
- Hotel services are not subject to conservation and development;
- Providing hotel services, the employee of the hotel enterprise comes in direct contact with the customer;
- Unlike the commodity market, where goods “go” to the buyer, in the hospitality industry, on the contrary, the consumer “goes” to the services of the hotel enterprise, ie. Hotel services are not subject to transport formation;
- The hotel service cycle depends on and varies according to the needs of the people: for example, in the hotel industry there is a typical daily, weekly, monthly, annual change request.

The complex nature of hotel services requires the production of each of its components, ie a specific type of service with a certain technology. It refers not only to a set of service operations and processes that are completed in a specific method and sequence but also to a system of rational ways of using hotel buildings, structures, equipment.

Neglecting the systemic approach to the quality of service leads to a sharp decline of the latter, disruption of its process technology, arbitrariness in the production of services, customer dissatisfaction, and, consequently, reduced demand. That is why it is necessary to develop and implement a service quality management system in each accommodation enterprise.

It should be noted that the economic form of operation of enterprises in the field and the labor of workers is an intangible product – a complex hotel service. Therefore, the final result of activities in this field can be revealed only in the process of providing and consuming services, ie. Directly in tourist accommodation enterprises. It is expressed in terms of the volume and quality of services produced. Quality of hotel services – a hotel management system that provides standardized and certified hotel product delivery to customers. Defines and ensures a combination of customer service features, processes, and conditions to

meet customer demand. Customer demand is usually expressed in terms of features and quantitative characteristics, including aspects such as functionality, comfort, safety, economic parameters, environmental friendliness. Hotel service features may differ from other product features and include categories such as hospitality, staff, customer service time, hygiene, trust, direct customer contact. The final criterion of quality – customer evaluation is often subjective.

The main task of the hotel service quality management system is to create a product that fully meets the needs of the public and the needs of customers. The process of quality assurance of hotel services is characterized by the following sequence: Before creating any hotel product, the nature of the demand must be clarified, then the features that must characterize the product must be specified.

After all, it is possible to plan (design) the service, its program, and its conditions, which should be closely related to the marketing program. Normally, the management process takes place through a feedback mechanism. Feedback in the hotel service quality management system should be considered as a mechanism for processing information received from staff and customers, which should, if necessary, influence the management process. This requires the establishment of a preventive-permanent operative feedback system. It should be considered as part of complex hotel service, each type of which is a separate block with its own structure – production processes, technology, local feedback mechanism. Only in this case, it is possible to produce a service focused on the principle of satisfying the interests of customers, based on the request of the guest.

Hotel services include pre-planned species, the nature of each of which is determined by the relevant industry profile. For example, catering and transport services may include direct catering services as well as public catering and transportation systems, cultural services – as well as related fields. Therefore, the quality management methods typical for the industry profile are used for these species, a wide range of

additional services – booking, business center, communication, household, commercial, medical (medical-preventive, cosmetic), sports-health, seminars, conferences, etc. Even more exciting is the arsenal of quality management methods.

Quality management is the control over the organization and delivery of services in the hotel enterprise, which implies the existence of the following management system:

- Personnel selection and training system. The hotel administration should establish a staff selection and recruitment service who have the knowledge and skills to provide high-quality service and should constantly monitor the qualifications of its staff;
- Quality control and standardization control system of the hotel service process. To set standards for hotel services, their owners and managers need to have a clear idea of what kind of idea they are trying to convey to their customers. It is therefore of great importance that each hospitality enterprise has its own code of standards. Standards should be flexible and reflect the needs and desires of customers, primarily regular customers, standards include not only the quality of customer service techniques but also the attitude of staff towards their work and guests;
- Customer satisfaction quality control system is achieved by analyzing customer complaints and suggestions, comparing the quality of competitors' services with the quality of their own services. Hotels can use grievances as a valuable source of shaping their advantage over competitors, as grievances point to ways of perfecting work, satisfying dissatisfied customers. Thus, the model hotel is characterized by the existence of a strategic planning system, the aspirations of the management to improve the quality of service, high standards of service, the control system of the offered services, the system of satisfaction of guest complaints.

Effective quality management at the hotel includes:

- Effective marketing management of the enterprise;
- Introduction of quality industry standard;
- Development of production process technology (normative description)
- Application of qualification requirements to employees (qualification standard);
- Introduce standardization of staff work;
- Fair labor evaluation and motivation;
- Existence of corporate culture.

Conclusion. The creation and development of an adequate quality system in line with the modern realities of the hotel business should become a strategic commercial imperative. The role of states lies in the balanced regulation of producers, for which it is necessary to create targeted state programs aimed at accelerating progress in this area. Thus, it can be said that the existence of a high standard of quality leads to an increase in the efficiency of the economy, increases the competitiveness of the product, increases the authority of countries in the world market.

References:

1. Amkoladze G., Amkoladze T., Giorgishvili N., Lomsadze-Kuchava M. Competitiveness. Quality and Project Management, Publishing House "Technical University", – Tbilisi, 2009. – 240 p.
2. Vasadze M. Hotel Management, Publishing House "Technical University"; – Tbilisi. 2009. – 280 p.
3. Konstantine Abuladze K. Basics of Hotel Business, – Tbilisi, 2015. – 320 p.
4. Ishikawa K. What is the universal quality management? Japanese Way, AOZT "TKB intercertifica", – Moscow. 2008. – 140 p.
5. Pender L. & Sharpley R. The Management of Tourism, Edited, SAGE Publications, London, Thousand Oaks, New Delhi. 2005. – 350 p.

<https://doi.org/10.29013/EJEMS-21-2-39-42>

Chechelashvili Maia,
Doctor of Economics (Ph. D),
Professor at the Georgian Technical University
Malania Elizabeth,
Doctor of Technics (Ph. D),
Professor at the Georgian Technical University
Berikashvili Leah,
Doctor of Economics (Ph. D),
Professor at the Georgian Technical University
E-mail: maiko@mail.ru

CHANGING MANAGEMENT PARADIGMS

Abstract. In this article, the authors investigate the most fundamental feature of the processes taking place in the modern economy – the reorientation from the production of material goods to the production of services. The authors argue that in the service sector of the economy from the point of view of changes in the structure of work, the most intensive changes occur where the production and consumption of services are closely related to each other. The authors conclude that the market is driven by a management model that relies on engagement and front-line staff with training and pay for all tasks at all levels of the organization. Another concluding comment by the authors is that there is a difference between production and service-oriented management models. According to the authors, a new customer-oriented accounting model needs to be developed.

Keywords: production of services; consumption of services; service-oriented management models.

The economic history of the twentieth century is partly confirmed by D. Bell's theoretical concept of the stages of development of civilization in pre-industrial, industrial, and post-industrial societies [5]. The most economically developed countries of the West entered the stage of post-industrial development more than 20 years ago. This circumstance allowed Francis Fukuyama to surprise the intellectual community at one time, prophesying about the end of history. According to Fukuyama, humanity has already reached the final forms of optimal state organization and economic development. In other words, Fukuyama believed that civilization had come to the creation of a "progress matrix" scheme, which leaves no room for individual countries to choose their

own, special path of development. Today, when the philosopher himself rejected his previous concepts, we can talk about the complete unpredictability of the world, impending chaos, the impossibility of sharing experience with other developing countries. Nevertheless, humanity could not help finding a way out of the dead-end of its so-called evolution.

According to the general recognition of the supporters of the post-industrial society, the most fundamental sign of the ongoing processes is the reorientation of production from the production of material goods to the provision of services and information processing. In turn, in the economic sphere of services, in terms of changes in the structure of the labor force and employment, these processes are most intense not

in those areas where traditional services are offered (household, transport, trade), but in those where people and consumed their services are closely related to each other. Thus, modern views on the future of society are associated with personal and professional development and improvement of the person himself. This leads to the identification of long and complex chains of personal and social needs as the main task, for example, favorable living conditions, health care, awareness-raising, human intellectual development, and other areas. Accordingly, at the top of this chain of needs should be healthcare, leisure and entertainment, telecommunications, and other industries, as well as the infrastructure that supports them.

In the twentieth century, fundamental changes in the nature and orientation of modern society led to the replacement of specific economic models of development and the corresponding paradigms of managing economic objects in a chronology that fully coincides with Bell's chronology:

- The beginning of the XX century is a period characterized by the orientation of companies towards production capabilities, the effective use of their resource potential, and the offer to consumers what the business entity considers necessary to produce (a striking example of such products is the serial production of standard products over the course of many years);

- The middle of the 50s – the period of dominance of the marketing approach with a focus on large segments of the mass market;

- The modern stage of economic development is characterized by the fact that the main issue of business success is the needs of client groups and, if possible, a specific client. The national economies of developed countries, which have passed to the post-industrial stage, are moving from mass production of standard products to highly specialized and small forms of production, taking into account individual needs.

The latter phenomenon, first introduced in England and then in international scientific literature and business practice, is known as customization and

means a unique, individual approach to creating a product and meeting the needs of a particular client. This is not only ethically attractive but also beneficial from an economic point of view, as it creates a concrete advantage for the customer by providing more value and quality. This concept has been scientifically developed among a number of researchers and has received the name "service factory" when its objects refer not only to the service sector but also to any business activity, externalization of business processes, a network of partnerships (often with a rather narrow content system). Creation of the term – "outsourcing". Under these conditions, the application of the principles and methods of operation of the "service factory" is seen as a competitive necessity, which is often referred to as a service imperative [3].

Thus, the provision of services aimed at meeting the specific personal and corporate needs of the client is carried out mainly by modern organizations, including its concepts, methods, and tools are used to manage service organizations, and competitive operating strategies are determined based on the best delivery skills. services. A society whose economic institutions are willing to adopt such approaches becomes truly service-oriented, along with the transformation of the industrial economy into a service-oriented economy.

For the development of service theory and, in particular, the theory of service management, it is necessary to identify a number of still changing management paradigms. Let us agree that paradigms are made up of values and procedures that determine our thinking and beliefs and, accordingly, the behavior of the organization. In this context, paradigms are part of organizational culture and, in theory, form the basis of scientific research. For paradigms to underpin innovation and change, they must first be defined – this is the first step in verifying their adequacy and taking advantage of new management approaches and practices.

To determine the essence of values associated with the characteristics of a particular type of

managerial thinking, three management paradigms can be distinguished: production, bureaucratic and legal, and service. It should be especially noted that paradigms cannot be named according to the type of organization from which they originated. The role of paradigms is that they represent an archetype.

The manufacturing paradigm is product-oriented. She focuses on technology research and projects, design, mass production, mass marketing, large-scale operations, automation, computer technology, and specialization. Productivity plays an important role here, and therefore the paradigm focuses on cost and capital use, while quality is reduced to adherence to technical standards and specifications.

The scientific approach to management is problematic in the sense that it is standardized. This philosophy is based on the concepts of authors of the late nineteenth and early twentieth centuries, such as Frederick Taylor, Henry Ford, and others. The idea is that the organization will be more efficient if the emphasis is on the division of labor and specialization. According to scientific leadership, the efficiency within each specialization becomes maximum or, in extreme cases, optimal. This concept worked quite effectively throughout the twentieth century.

The industrial management paradigm is rooted in the manufacturing sector and is still used by many service organizations today. Organizations using this approach find positioning strategy, promotion, and advertising to generate sales revenue; At the same time, labor and other operating costs should be kept to a minimum. In general, the industrial paradigm focuses on revenue and operating costs and does not consider the role of staff in meeting customer needs and generating significant profits [1].

Industrialists believe that good workers are hard to find. The industrial model supports the idea that

“everything is the same, so it is better to trust people than technology, machines, and systems.” [4]. Adherents of this approach believe that most service providers are indifferent, low-skilled, and unable to do anything but simple tasks. Thus, the workplaces in the industrial model are narrow and leave almost no room for service personnel to make independent decisions. To reduce operating costs, many firms, following the industrial model, are replacing their permanent staff with less experienced and less dedicated temporary workers. In some cases, employees are laid off in order to minimize the company’s operating costs until the conditions for mandatory wage increases and other benefits are introduced. However, with the development of post-industrial society, this approach no longer “works”, because society has reached a state where a service is important, and service is not a function, but a process that includes many business functions.

Conclusion

The three types of paradigms discussed highlight different aspects of governance. The discipline, precision, and standardization of the manufacturing paradigm can be used in part in service operations as well as in efforts to treat clients with respect in the context of the legal-bureaucratic paradigm. The appeal to the service paradigm occurs in all types of organizations, but the transition period lasts a long time, so the paradigm of management services in practice is often more fashionable rhetoric than the actual activity.

Achieving leadership in the service sector and economic well-being is becoming the main task of single enterprises. This problem is all the more relevant both for theory and practice. We can only wish the service paradigm to be at the center of all types of business in the future.

References:

1. Albrecht K., Zemke R., *Service America*, Homewood, IL: Dow Johns-Irwin, 1985.– P. 31–47.
2. Bell D. *The Coming of Post-industrial Society: A Venture in Social Forecasting*, Basic Books Inc.,– New-York, 2013.

3. Chase R. B., Garvin D. A. The Service Factory, Harvard Business Review.– Vol. 67.– No. 4.– July/August, 2009.– P. 91–69.
4. Schlesinger Leonard A., Heskett James I. The Service-driven Service Company.– 71 p.
5. Bell Daniel. The Coming of Post-industrial Society: A Venture in Social Forecasting, Basic Books Inc.,– New-York, 1973.

Section 4. Regional economy

<https://doi.org/10.29013/EJEMS-21-2-43-50>

Sugiyarsih Susi,

Suwitri Sri,

Larasati Endang,

Ngatno,

Doctoral program of public administration

Faculty of social and political sciences

Diponegoro university, Semarang, Indonesia

E-mail: jenewa.alexandra@gmail.com

QUALITY OF TAX SERVICE AT PRATAMA CIREBON ONE TAX SERVICE OFFICE

Abstract. Quality is often interpreted as an everything that satisfies the customer or lives up to expectations. Service quality assessment is carried out at the time of the service implementation, namely when there is contact between service recipients or consumers and the public with the party providing or service officers. The quality of tax services can be seen from the characteristics of professionalism of officers in providing services in accordance with the demands of taxpayers, it seems that in reality public service providers are not always able to feel and understand the public desire of taxpayers appropriately. This research aims to find out the quality of tax services at the Cirebon One Primary Tax service office. This research applies qualitative method, research design refers to field observation, and interview and documentation study to obtain data and information. The quality of tax services will be seen in terms of equality, fairness, loyalty and responsibility. The quality of tax services has not fully fulfill the demands of taxpayers, if the government is able to show the benefits of the tax system has been ensured that the public performs tax obligations correctly in accordance with tax laws and increasingly achieves expectations. The results show that if the officer performs his duties with creativity, innovation and commitment, it can encourage all elements of the taxpayer public to increasingly trust and grow compliance to pay taxes, as the fulfillment of shared needs and caring attitudes for others. This is allowing that the tax can treat the community more voluntarily in fulfilling obligations to the state for the nation's welfare.

Keywords: Service Quality; Similarity; Fairness; Loyalty and Responsibility.

I. Introduction

The service quality can be interpreted as everything that satisfies the customer or according to the required necessities. Taxpayer awareness is a factor in

the high level of compliance of taxpayers in complying with tax obligations. To become an independent nation, the government has to be able to increase state revenues, one of which is from taxes. An independent

nation cannot be separated from the role of its community and administratively as well as operationally continues to demand the ability of the Directorate General of Taxation to be able to achieve the acceptance target as expected, and the government wishes to encourage a sense of responsibility and can provide quality services to the community. Given how important receipts from the tax sector are, therefore the obligation of citizens in paying taxes is contained in the 1945 Constitution Article 23A states "Taxes and other levies that are coercive for the purposes of the state are regulated by law".

The provision of public services by the state to its citizens is one form of transaction between the state and its citizens; the public wants to see clearly, what has been implemented with the tax money they have paid, whether the service becomes smooth, whether the means associated with the public interest are getting better and noticed by the government. As contained in (Indonesia [7]) on public services that: "The state is obliged to serve every citizen and resident to fulfill its basic rights and needs within the framework of public services. Quality can be used to assess or determine the level of adjustment of a thing to its requirements or specifications (Pasolong [10]).

To creating easy access the extent of the services quality provided by tax officials, there needs to be criteria that indicate whether a service provided is qualified or not. The service quality in practice has not been so evident about the equal treatment for the taxpayer public that approaches the element of justice, especially for a pluralistic society. The reality is that the submission of Annual Notification Letter (SPT) has not been able to build public awareness of taxpayers because the quality of tax services provided by tax officials has not fulfilled public expectations. Taxpayer satisfaction in the management of government tax receipts is more informed about the level of misappropriation than concrete evidence of infrastructure development, economic improvement and social welfare.

According to the research from Bătrâncea et.al, [3] on the tax compliance model with an emphasis on the economy and a behavioral perspective is conveyed

so that governments and tax authorities should consider that model when designing fiscal policy. Those Aspects considered are sociological and psychological factors, which form compliance, namely, attitudes, beliefs, norms, perceptions, motivations. The research, authors, looked at the impact that tax officials' services have on taxpayers on sociological and psychological factors such as beliefs, norms, and motivations. The Research conducted by (Efebera, Hayes, Hunton, & O'Neil [5]) as they have historically been viewed as having an immaterial impact on Federal tax revenues. However, the earned income tax credit (EITC with the title of the research *Tax Compliance Of Intention Of Low Incomes Individual Tax Payers in 2004*) explained in the research that compliance and intention have a positive relationship that is with the perception of shares to the tax system, normative expectations in compliance and punitive giving.

At this time, the role of tax has dominated the Domestic Government in the Indonesian State Budget. The government set a target of IDR1,861.8 trillion In the Draft State Budget (RAPBN) 2020. The target is 13.3% higher than the projected tax revenue in 2019 of 1,643.1 trillion. Meanwhile, the tax ratio is targeted to reach 11.5% of GDP by 2020. This is also higher than the 2019 tax ratio of 11.1% (Badan Pusat Statistik, [2]). According to (UU No. 27 TH 2007 [15]), tax is a mandatory contribution to the State owed by a person or entity that is coercive under the Law by not getting directly rewarded and used for the purposes of the State for the greatest communities prosperity.

The quality necessity of tax services is a shared responsibility between officers of the Directorate General of Taxation and the taxpayer community. The quality of tax services is currently one of the crucial issues for officers of the Directorate General of Taxation and a demand of taxpayers. As stated in the regulation of the Director General of Taxation Number PER-02/PJ/2017 concerning Amendments to the Regulation of the Directorate General of Taxation Number PER-27/PJ/2016 concerning Standards of Service in the Integrated Service Office of the Tax Service Office.

Moreover, it is also listed also in article 7 point a in the circular of the Director General of Taxation Number SE-55/PJ/2008 concerning the quality of tax services.

(Chaizi [4]) stated that tax administration reform is an improvement or improvement of performance in the administration, either individually, group or institutionally. The goal is to be more efficient, economical and fast. This can happen if; (1) Simplified tax structure for ease, compliance and administration, (2) a suitable reform strategy shall be put forward, (3) a strong political commitment to improving tax administration. Awareness and compliance of taxpayers in tax obligations is an important factor for the increase of tax recipients of a country, therefore there is a necessity to be a regular review of the factors that affect the compliance level of taxpayers.

At the Cirebon One Primary Tax Service Office, where taxpayers who perform tax obligations in Tax Service Office Pratama Cirebon One in the annual reporting notification of personal tax persons tax year 2016–2018. In 2016, of the number of registered taxpayers, 134,188 people reported that notification letter amount 28,026 people. In 2017, amount 29,518 registered taxpayers who reported notification letter amount 27,670 people. While in 2018 from the number of registered taxpayers amount 31,243 people who reported notification letter amount 29,939 people.

Tax Service Office Pratama Cirebon One has the number of private taxpayers registered in 2018 tax

year of 31,243 taxpayers. The large number of taxpayers has the same characteristics as other taxpayers registered in Tax Service Office Pratama, especially in Cirebon. Cirebon City as one of the cities that is being improved and developed in West Java is considered potentially in ranking income from the tax sector and increasing public participation in tax administration. The tax potential spread in Cirebon City area is very wide in collecting tax receipts; the administrative area of Cirebon City covers an area of 37.54 Km.

Service areas include housing complexes, shopping complexes, transportation, warehousing, shopping centers, universities, educational institutions, retail trade centers, government offices, office buildings, hospitals, banks, and others, and have a variety of business types, namely industrial businesses, construction, accommodating services, transportation, warehousing, trade, restaurants, companies and other businesses. The working area of Tax Service Office Pratama Cirebon One includes 5 (five) sub-districts consisting of 22 (twenty-two) sub districts. The wide working area and large business potential has not been balanced with the service quality.

Taxpayers who perform tax obligations in Tax Service Office Pratama Cirebon One in this case the reporting of the annual tax return of private persons in the period of 2016–2018 tax years is presented in (Table 1) below.

Table 1.– Tax Service Office Taxpayer Compliance Statistics Primary Cirebon One

Classifications	2016	2017	2018
1. Registered Taxpayers Must Be Notified	134.188	29.518	31.243
• Organization	8.128	3.199	3.192
• OP Non-Employee	13.166	4.439	6.528
• OP Employee	112.894	21.880	21.523
	2016	2017	2018
2. Realization Of Notification Letter	28.026	27.670	29.939
• Organization	2.069	2.069	2.220
• OP Non-Employee	3.830	4.240	4.693
• OP Employee	22.127	21.361	23.026

Source: (Pemerintah Republik Indonesia, 2019)

Based on table 1, it appears that tax receipts obtained by Tax Service Office Pratama Cirebon One during the last 3 (three) years have experienced ups and downs. In 2016, Tax Service Office Pratama Cirebon One collected taxes worth 656,062.61 million rupiah, decreased in 2017 to 604,188.85 million rupiah, then increased in 2018 to 720,874.15 million rupiah.

II. Research problems

Based on the description in the background of the research there are several problems in the implementation of the quality of service in the primary tax office Cirebon One is as follows:

1. Public taxpayers have not received services in the same treatment provided by tax officials.
2. Consistency in service, honesty, fair treatment and loyalty in the implementation of taxpayers is still low.
3. The readiness and responsibility of the officer in serving has not been as expected.
4. Limitation of taxpayers' digital capabilities in the application of modernization of taxation

The system of tax service information and officers have not maximally implemented physical facilities.

III. Research method

In this study, the approach used is qualitative research. (Moleong [9]) defined qualitative methodology as a research procedure as a research procedure that produces descriptive data in the form of written or spoken words from people and observable behavior.

This approach is directed at the background of the individual holistically (intact). Therefore, in this case, it should not isolate an individual or organization into variables or hypotheses, but it is necessary to view it as a whole. This research requires primary data and secondary data. Primary data is data obtained from the collection information from informants and field condition records obtained through observations at the research site using interview guidelines. While the secondary data is obtained from the literature and documentation study owned by the Tax Service Office of Pratama Cirebon One.

The main method of analysis in this study is qualitative data. Where analysis requires drafting very broad information, moving from conversation or writing to files and making decisions whether analyzing data by hand or computer (Imam Ghazali [6]). Data analysis is the process of composing data so that it can be interpreted widely. Building data means classifying it into patterns, themes or categories. Interpretation means classifying it to the results of analysis, explaining patterns or categories, looking for relationships between various concepts that become the basis theory. The data analysis steps in this study used interactive model data of analysis techniques (B. Miles, Huberman, & Saldana [1]; Sugiyono [14]) for data analysis conducted through data collection, data reduction; display data; and conclusion drawing/verification.

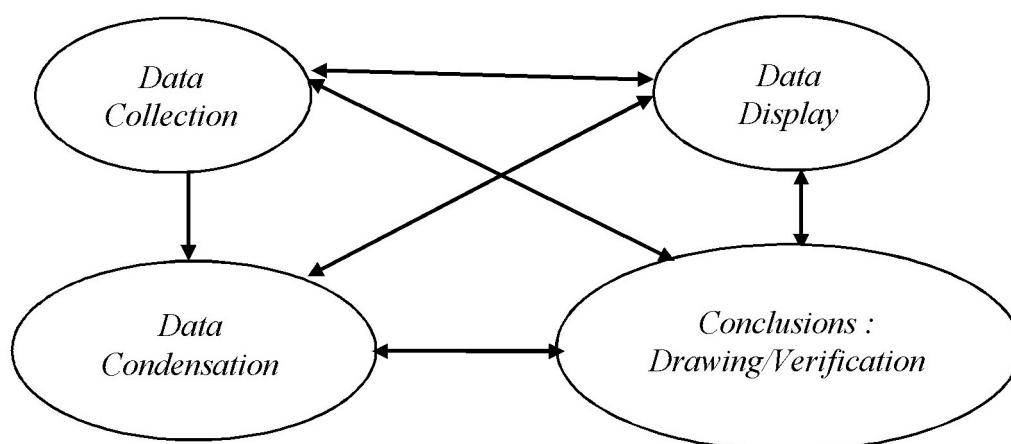


Figure 1. Components in Data Analysis of Data Validity
Source: (B. Miles et al. [1]; Sugiyono [14])

In this study to test the validity of data used data triangulation techniques that combine from various data collection techniques with triangulation, then actually researchers collect data with triangulation, then actually researchers collect data that simultaneously tests the credibility of data, namely checking data credibility with various data collection techniques and various data sources (Sugiyono [13]).

Triangulation Techniques, means researchers use different data collection techniques to obtain data from the same source. Researchers used participatory observations, in-depth interviews, and documentation for the same data source simultaneously. The implementation of services at the Primary Tax Office is based on tax regulations and tax administration that is effective, efficient, and trusted by the public, by prioritizing the public interest of taxes. This research was conducted to describe and analyze the quality of service by tax officers Cirebon One by using four aspects, namely *equality*, *equity*, *loyalty*, *responsibility*, and factors that contribute to the service quality and the ideal service quality model in the Tax Service Office Pratama Cirebon One.

It seems that the response of the informant of the tax service operator regarding the quality of tax services almost provides positive information because it always takes refuge in the name of rules and regulations. However, when paying attention to the informant's answer about the quality of tax services provided by tax service officials, taxpayers aren't generally satisfied with the tax services at the Cirebon One Primary Tax Service Office. This reality provides an overview of the gap or gap that inhibits between tax service officials and the taxpayer public regarding the quality of tax services at the Cirebon One Primary Tax Service Office.

IV. Result and discussion

– Analysis of the tax services quality at the Office of Tax Services Pratama Cirebon one

The Research on the tax services quality at Tax Services Office Pratama Cirebon One was conducted by analyzing four aspects. These are namely

the aspect of equality seems that taxpayer services performed both primary and secondary still need to be improved, as a result of the lack of optimal administrative system, especially the modernization process has not been maximized and the taxpayer public considers the element of taxpayers still need to be improved in serving taxpayers. The tax service of administration system is still unable to create an equitable bargaining position between the tax officer as the implementer of the law and the taxpayer public as the recipient of the tax service. The main obstacles lie in human resource incompetence, role incompetence and weak bargaining power.

Equity aspects have not shown attitudes and actions that have not been neutral, there is still a discriminatory not all taxpayers are treated equally, social and economic values are enforced, so that the neutrality of officers and honesty in providing services is still difficult to prove. In this study, the element of *equity* (*fairness*) is measured by fair service, accuracy of service in accordance with the provisions, fairness in the time of tax service, fairness of officers to the rules of tax services, fairness in tax laws and the suitability of services provided with applicable provisions. With the fulfillment of the principle of fairness in tax collection, it is very unlikely that taxpayers in neglecting their obligations, taxpayers will prefer to comply in terms of fulfilling their tax obligations rather than having to bear the sanctions given. Generally compliance in fulfilling its tax obligations is a fair taxation system”.

Aspects of *loyalty* shows that transparency and accountability of services have not been able to be realized in real terms, due to the lack of fulfillment of basic rights of public needs of taxpayers, concerning procedures and mechanisms of service work are less informative, less accommodating, inconsistent, limited facilities, facilities and infrastructure services, so as not to guarantee legal certainty, time and cost, and allow actions that indicate discrepancies. Aspects of responsibility as a public service management tool have not been so evident in the ability to improve the public satisfaction index of taxpayers. Public services

conducted by government officials are still found a point of weakness so that it can not fulfill the quality expected by the taxpayer public, marked by the number of public complaints of taxpayers. As a result of the imbalance between the services needed and the expected results.

To improve voluntary taxpayer compliance, good service is required for taxpayers, equality, fairness and openness in implementing tax regulations. Therefore, quality services provided by tax organizations can build taxpayer compliance if the commitment applied as one of the supporting achievements of the expectations of the Cirebon One Primary Tax Service Office. Commitment in quality service becomes one of the main principles in tax collection as the embodiment of state obligations. Although taxpayers are given the trust to calculate report and pay the amount of tax owed, taxpayers must remain honest and always stick to the provisions of applicable tax laws.

If the government is able to show the benefits of the tax system, it is certain that the public wants to carry out its tax obligations correctly in accordance with tax legislation. Therefore, it is appropriate for the government to improve the tax system, not only based on its tax rules, but also to regulate the benefits of the tax obligations for the public will carry that out. According to (UU No. 28 Tahun 2007 [16]) concerning the Fourth Amendment to (Presiden Republik Indonesia [12]) concerning General Provisions and Procedures for Taxation of taxpayer compliance can be identified as taxpayer obligations in taxation.

Formal compliance in taxation means the state of taxpayers who carry out their rights and obligations in a disciplined manner in accordance with applicable laws and regulations (Widjaya [17]). Compliance in taxation is the level to which taxpayers comply with tax laws. Submission compliance is part of an individual's moral obligations. Norma cannot be separated from the honesty of taxpayers in fulfilling their tax obligations. Perceived behavioral control

in the context of taxation is how strong a taxpayer's level of control is in displaying certain behaviors, such as reporting their income lower, reducing the burden that should not be reduced to income, and other tax non-compliance behaviors.

Letter submission compliance (filing compliance) context of the implementation of *self-assessment* system is closely related to the level of compliance of taxpayers in the payment of correct and honest taxes. However, in reality, the implementation of taxation with a *self-assessment* system shows the level of compliance of taxpayers is still low so that it demands the Tax Service Office always to conduct coaching and supervision in taxation for taxpayers.

Commitment in the tax system there are limitations (*constrains*) as an indicators that indicate the level of compliance (*tax compliance*) of taxpayers. Among others, it concerns the timing of the implementation of tax obligations (*time compliance*) and the amount of taxable compliance. Taxpayers are said to be non-compliant or non-compliant if they do not carry out their tax obligations (not registering themselves, not paying and reporting their taxes correctly) in accordance with the set period, or the amount paid is lower than the actual one. Based on the Law on General Provisions of Taxation, the taxpayers are referred to as follows:

1. Timely in delivering the Notification Letter;
2. Have no tax arrears for all types of taxes, except tax arrears that have obtained permission to installment or delay the payment taxes;
3. Financial Statements are audited by public accountants or government financial supervisory institutions with unqualified opinions for 3 (three) consecutive years; and Never been convicted of a criminal offence in the field of taxation based on the decision of a Court that has had a permanent legal force in the last 5 (five) years.

Researchers visualize the ideal model of ideal tax service quality proposal at the Office of Tax Services Pratama Cirebon One below:

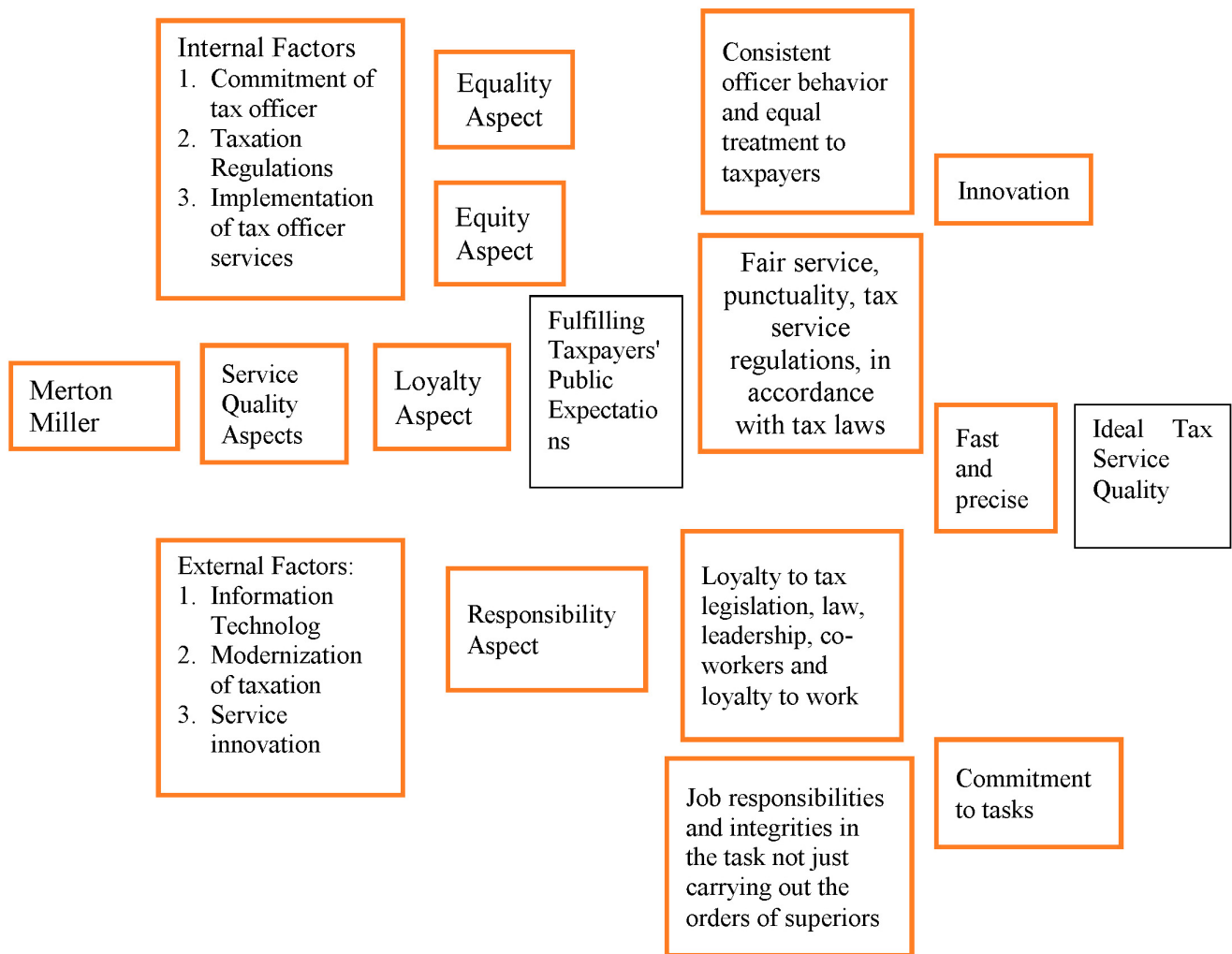


Diagram 1. Ideal Tax Service Quality Proposal Model
Source: Data Researcher (2019) Managed

V. Conclusion

The results of the research that has been done that the quality of Tax Services Office Pratama Cirebon One has used the four aspects according to the theory from (Miller [8]) theory, namely; *equality*, *equity*, *loyalty*, *responsibility*. While the compliance of reporting (*reporting compliance*) of taxpayers to fulfill their tax obligations able to increase while the tax officer is committed to upholding a fair taxation system and the results are really intended solely for the fulfillment of public goods and services, not the other way around. Therefore, the service quality seen from the equality aspect of taxpayer services performed both primary and secondary still needs to be im-

proved. For *equity*, aspects have not shown a neutral attitude and action, there are still differences in services, because not all taxpayers are treated equally. While the aspect of *loyalty* has not been optimal as real shows that transparency and accountability of services have been realized and felt by the public. Aspects of responsibility as a public service management tool have not been so evident in the ability to increase public satisfaction of taxpayers.

So if the tax officer can carry out the four aspects according to (Miller [8]) said that: "The important elements of the quality of tax services are *Equality* (equality of tax services), *Equity* (fairness), *Loyalty*, *Responsibility*, and *Commitment* to factors that con-

tribute to improving the service quality and supporting the quality model of service. These are in accordance with the expectations of taxpayers, and then the quality of tax services is carried out well. This is based on the type of bureaucratic behavior that consistently provides quality services to all parties

regardless of political affiliation, social status and so on. If it fulfill or exceeds taxpayer expectations or the smaller the gap between the fulfillment of the promise and the expectation of the taxpayer is the closer the measure of performance to the standards expected by the taxpayer.

References:

1. Miles B., Huberman M. A. M., & Saldana J. *Qualitative Data Analysis* – Matthew B. Miles, A. Michael Huberman, Johnny Saldaña – Google Books. Sage Publications. 2014. URL: <https://doi.org/10.1016/j.revmed.2011.11.010>
2. Badan Pusat Statistik. *Pertumbuhan Ekonomi Indonesia Triwulan IV-2019*. Wwww.Bps.Go.Id. 2020.
3. Bătrâncea L. M., Nichita R. A., Bătrâncea I. & Moldovan B. A. Tax compliance models: From economic to behavioral approaches. *Transylvanian Review of Administrative Sciences*,– (36). 2012.– P. 13–26.
4. Chaizi N. *Reformasi Administrasi Publik: Teori dan Praktik*. – Jakarta: Grafindo. 2014.
5. Efebera H., Hayes D. C., Hunton J. E. & O’Neil C. Tax compliance Intentions of Low-income Individual Taxpayers. *Advances in Accounting Behavioral Research*. 2004. URL: [https://doi.org/10.1016/S1475-1488\(04\)07001-2](https://doi.org/10.1016/S1475-1488(04)07001-2)
6. Imam Ghozali. *Structural Equation Modeling Metode Alternatif dengan Partial Least Squares (PLS) (IV)*. Semarang: Badan Penerbit Universitas Diponegoro. 2014. Retrieved from: URL: <https://digilib.un-dip.ac.id/v2/2012/10/04/structural-equation-modeling-metode-alternatif-dengan-partial-least-square>
7. Indonesia P. R. (2009). UU Nomor 25 Tahun 2009 Tentang “Pelayanan Publik”. UU Nomor 25 Tahun 2009 Tentang “Pelayanan Publik”.
8. Miller M. H. Debt and Taxes. 1977. *The Journal of Finance*. URL: <https://doi.org/10.1111/j.1540-6261.1977.tb03267.x>
9. Moleong L. J. P. D. M. A. *Metode Penelitian*. 2000. Penelitian. URL: <https://doi.org/10.1021/ol7029646>
10. Pasolong H. *Teori Administrasi Publik*. In Cetalan Ketiga. Bandung: CV. Alfabeta. 2011.
11. Pemerintah Republik Indonesia. *Sistem Informasi Direktorat Jenderal Pajak*. 2019. Retrieved from: URL: <https://www.pajak.go.id/id/artikel/reformasi-teknologi-informasi-perpajakan>
12. Presiden Republik Indonesia. *Undang-Undang Republik Indonesia Nomor 6 Tahun 1983, Ketentuan Umum dan Tata Cara Perpajakan § (1983)*.
13. Sugiyono. *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta. 2014.
14. Sugiyono. *Memahami Penelitian Kualitatif*. Bandung: Alfabeta. 2016.
15. UU No. 27 TH 2007. Nomor 27 tahun 2007. *Tentang pengelolaan wilayah pesisir dan pulau-pulau Kecil*. Sekretaris Negara. 2007.
16. UU No. 28 Tahun 2007. *Pajak.go.id*. Wwww.Pajak.Go.Id. 2007.
17. Widjaya A. G. *Studi Evaluasi Kepatuhan Wajib Pajak Sebelum Dan Sesudah Reformasi Perpajaka Pada KPP Pratam Kota Semarang Di Lingkungan Kantor Wilayah Direktor Jendral Pajak Jawa Tengah I*. *Tax and Accounting Review*. 2011.

Section 5. Regional economy

<https://doi.org/10.29013/EJEMS-21-2-51-54>

*Budniak Liubov Mykolaivna,
Associate Professor of Finance, Banking,
Insurance and Electronic Payment Systems
Podolsk State Agrarian and Technical University
Kamyanets-Podilsky, Ukraine
E-mail: budnyakluba@gmail.com*

BASIC METHODOLOGICAL ASPECTS OF ANALYSIS OF INNOVATIVE ACTIVITY OF ENTERPRISES

Abstract. The article proposes the vision of various scientists regarding the disclosure of the essence of the concept of innovative activity, indicators and research directions of this process. The emphasis is on the lack of coverage of methodological issues and, as a result, the lack of a stable system of indicators, methodological stages and research techniques.

Keywords: innovations, innovative activity, researchers, expenses, types, sources of financing, innovative products, innovative technologies, effect.

*Будняк Любовь Николаевна,
доцент кафедры финансов, банковского дела,
страхования и электронных платёжных систем
Подольский государственный аграрно-технический университет
Каменец-Подольский, Украина
E-mail: budnyakluba@gmail.com*

ОСНОВНЫЕ МЕТОДИЧЕСКИЕ АСПЕКТЫ АНАЛИЗА ИННОВАЦИОННОЙ АКТИВНОСТИ ПРЕДПРИЯТИЙ

Аннотация. В статье предложено видение различных учёных по поводу изучения проблемы инновационной активности, показателей и факторов обуславливающих данный процесс. Акцент сделан на недостаточности освещения вопроса методического характера и, как следствие, отсутствие стабильной системы показателей, методических этапов и приёмов исследования.

Ключевые слова: инновации, инновационная активность, исследователи, расходы, виды и источники финансирования, инновационная продукция, инновационные технологии, эффект.

Инновационная деятельность предприятий уже давно стала главным условием их конкурентоспособности и требует системного управления. В XXI веке в конкурентной борьбе выигрывают

те предприятия, которые являются инновационно активными. Если же предприятие не является лидером отрасли, именно инновационная активность становится основой сохранения его на рынке или даже выживания.

Изучением инноватики и инновационной активности предприятий занимались ряд ученых. Среди них можно выделить таких как: Т. Васильева, А. Гальчинский, В. Гейц Н. Гладинец, П. Григорук, Т. Гринько, В. Гусева, М. Джаман, Я. Жалило, А. Жихор, С. Ильенкова, В. Мазур, В. Мальцев, И. Одотюк, А. Шовкалюк, А. Чемодурова, А. Фащевская, Л. Федулова, А. Яковлева и другие.

Ими исследовались динамика, тенденции, темпы и пропорции инновационного развития предприятий, влияние факторов конкурентоспособности на повышение уровня инвестиционной активности предприятий, регионов и экономики в целом. Наряду с этим недостаточно внимания уделялось исследованию факторов социально-экономического направления, нестабильной политической и экономической ситуации на состояние инновационного развития национальной экономики. Не в полном объеме раскрывались вопросы, связанные с методикой и методологией исследования данной проблемы. Как следствие, отсутствует стабильная система показателей, методических этапов и приёмов исследования.

Цель статьи – систематизация информации по поводу методики исследования вопроса инновационной активности предприятий в условиях нестабильной экономической и политической ситуации основываясь на статистической отчетности Хмельницкой области.

Изучивши статистическую информацию Хмельницкой области делаем вывод, что отсутствует системность последней. Так, динамический ряд некоторых показателей проанализировать невозможно, в связи с тем, что за ряд лет информация либо отсутствует, либо является коммерческой тайной (к). Причем один год коммерческая тайна, а другой нет. По нашему мне-

нию нужно поработать над этим вопросом и все упорядочить.

Методологической базой исследования выступают такие приемы и способы – анализ и синтез, индукция и дедукция, сравнение, ряд динамики, монографический и тому подобное.

Под инновационной деятельностью, на наш взгляд, следует понимать все действия научного, технологического, организационного, финансового и коммерческого характера, приводящих к совершению инноваций.

Предприятия, осуществляющие инновационную деятельность можно отнести к инновационно активными.

Методика анализа инновационной активности предприятий предусматривает освещение этапов проведения исследования данного процесса с раскрытием соответствующей системы показателей.

На первом этапе анализа инновационной активности предлагаем исследовать работников, которые были задействованы в выполнении научных исследований и разработок. Показателями, при этом выступают – общее количество работников всего, в том числе исследователей в разрезе категорий персонала (исследователи, техники и вспомогательный персонал), уровня образования, отраслей науки, возраста, пола и тому подобное. Особое внимание предлагается уделить исследованию этих показателей на базе района, области, страны и тому подобное.

Второй методический этап предполагает изучение внутренних затрат на выполнение исследований и разработок. Система показателей при этом включает общий объем инновационных расходов, в том числе по направлениям инновационной деятельности, расходы на выполнение исследований и разработок по видам, источникам их финансирования и отраслям науки в разрезе видов работ. Здесь, как и на предыдущем этапе значительное внимание уделяется анализу вышеуказанных показателей на макроуровне.

Следующим шагом анализа является изучение динамики предприятий, которые внедряли

инновации (продукцию и / или технологические процессы).

Абсолютные величины динамики предприятий, которые внедряли инновации (продукцию и / или технологические процессы) по сути пере-

кликаются с показателями инновационной активности предприятий и свидетельствуют о том, что инновационные продукция и технология являются основными аспектами инновационной деятельности предприятий Хмельницкой области.

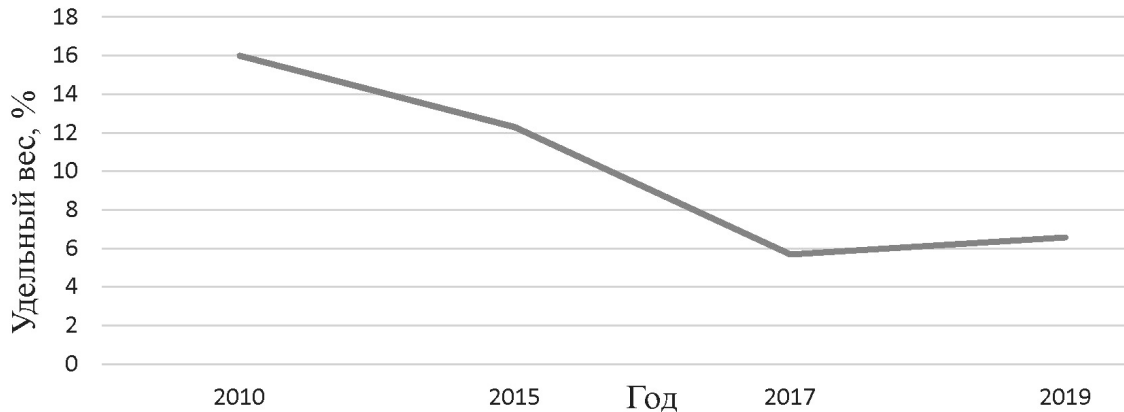


Рисунок 1. Удельный вес предприятий Хмельницкой области Украины, которые внедряли инновации к общему количеству предприятий

Источник: систематизировано на базе статистической отчетности Хмельницкой области Украины [5]

Рисунок 1 свидетельствует о том, что уменьшился удельный вес предприятий, которые внедряли инновации. Небольшое оживление наблюдаем лишь 2019 года. Но, для достижения хотя бы уровню 2010 году нужно хорошо поработать.

Следующим шагом анализа является исследование количества внедрений инновационной продукции и объёма реализованной инновационной продукции. Количество внедрённых новых видов инновационной продукции (товаров, услуг) в динамике уменьшилась. Так, если в 2010 году эта величина составляла 36 единиц, то 2019–13, то есть в 2,8 раза меньше. Правда, по сравнению с предыдущим годом наблюдаем положительную динамику и увеличение выше указанной величины в 1,9 раза. Если в начале динамического ряда инновационные внедрения не ограничивались только новыми машинами, оборудованием и аппаратами, то 2019 – только техническими средствами.

Наряду с уменьшением в количественном отношении инноваций, объём реализованной инновационной продукции (товаров, услуг) уве-

личился и причем существенно. Величина роста в динамике составила 680%. Последнее можно объяснить тем, что реализованные инновации были успешными и имели определенный экономическую выгоду.

По результатам проведенных исследований делаем вывод, что исследование инновационной активности предприятий должна проводиться комплексно и системно. Прежде всего нужно урегулировать вопросы, связанные с информационной базой. Она является поверхностной и ненаполненной. Проведённая унификация не позволяет сделать обоснованные выводы о состоянии и перспективе процесса инновационной активности предприятий Хмельницкой области.

Наряду с этим предлагается проводить анализ инновационной активности предприятий акцентируя внимание на таких методических этапах:

1. Состав и структура работников (в том числе исследователей) задействованных на выполнение научных исследований и разработок. Их качественная характеристика. Показателями, при

этом выступают – количество работников всего, в том числе исследователей в разрезе категорий персонала, уровня образования, отраслей науки, возраста, пола и тому подобное. Особое внимание уделяется исследованию этих показателей на микро- и макроуровнях.

2. Изучение уровня внутренних затрат на выполнение исследований и разработок. Система показателей, при этом, должна включать общий объем инновационных расходов, в том числе по направлениям инновационной деятельности, затраты на выполнение исследований и разработок по видам расходов, источникам их финансирования и отраслям науки в разрезе видов работ. Здесь,

как и на предыдущем этапе значительное внимание уделяется микро- и макро уровневому анализу.

3. Исследование инновационной активности предприятий предусматривает изучение динамического ряда количественных показателей инновационно-активных предприятий, технологий и видов продукта, их удельного веса, понесенных затрат по направлениям инновационной деятельности, в разрезе городов и районов и сопоставление полученных доходов с расходами.

4. Прогнозирование инновационной активности предприятий возможно проводить используя линии тренда и другие приёмы, предназначены для этого.

Список литературы:

1. Будняк Л. М. Проблемы инновационно активных предприятий и пути их решения // *Humanities and Social Science*, – IX (44). Issue: 249, 2021. Feb, – P. 21–25.
2. Васильева Т. А. Интегральное оценивание инновационного потенциала национальной экономики Украины: научно-методический подход и практические расчеты // *Актуальные проблемы экономики*, – № 6. 2013. – С. 50–59.
3. Григорук П. Н. Интегральные оценки уровня и динамики инновационного потенциала региона // *Маркетинг и менеджмент инноваций*, – № 3. 2016. – С. 109–129.
4. Лаврук В. В., Будняк Л. Н. Современное состояние и задачи инвестиционного обеспечения развития и повышения конкурентоспособности отраслей сельского хозяйства. URL: http://www.investplan.com.ua/pdf/2_2020/3.pdf
5. Статистический ежегодник Хмельницкой области за 2019 г. / Под редакцией начальника главного управления статистики в Хмельницкой области Л. А. Хамской, м. Хмельницкий, 2020. – 457 с.

Section 6. Economics of recreation and tourism

<https://doi.org/10.29013/EJEMS-21-2-55-58>

Akimishvili Nino,

The Doctoral Student of Georgian Technical University

E-mail:maiko@mail.ru

THE COVID-19 PANDEMIC AND ITS IMPACT ON THE TOURISM INDUSTRY AND HOSPITALITY

Abstract. The article discusses the problem of the COVID-19 pandemic and its impact on the tourism industry. According to the author, the current situation has had a significant impact on all spheres of the world economy, including tourism. In support of his main provisions, the author cites the opinion of experts, according to which such a crisis in tourism has not been observed since the Second World War. The author examines the results of a 2020 World Tourism and Travel Council (WTTC) study, according to which the virus pandemic is cutting up to a million jobs in global tourism every day. In conclusion, the author sets out his recommendations.

Keywords: pandemic, tourism industry, negative impact.

In early 2020, all countries were swept by a pandemic of a new type of virus, COVID-19, announced by the World Health Organization. The virus, the first outbreak of which was recorded in Wuhan, China at the end of 2019, has spread to all countries and continents. The borders of the countries were closed, air and rail links were stopped, and a regime of general self-isolation was introduced in many cities. It is worth noting that this is not the first time humanity is faced with a pandemic, while earlier the arsenal of means for fighting viruses was much smaller. The fundamental difference between the current pandemic is the simultaneous emergence of the so-called “pandemic of fear” associated with the rapid development of information technology and the instantaneous dissemination of information in the modern world.

The current situation has had a significant impact on all areas of the world economy, including tourism. As experts almost unanimously point out, such a cri-

sis in tourism has not been observed since the Second World War. According to a study by the World Tourism and Travel Council (WTTC) in spring 2020, the virus pandemic began to cut up to a million jobs in global tourism every day. In this regard, Germany was the worst hit European country, with nearly 1.6 million jobs at risk. In second place was Russia, in third – Italy and Great Britain. In addition, Brazil, France, Japan, Indonesia, and India were hard hit. According to the researchers, only the Middle East experienced the least destructive effect from the virus. Total losses for the industry due to the virus in 2020 amounted to \$2.1 trillion.

The World Tourism Organization has prepared its recommendations to mitigate the socio-economic impact of the pandemic on tourism in various countries. The document was developed with the participation of the World Health Organization (WHO), International Civil Aviation Organization (ICAO), International Maritime Aviation (IMO), Airports

Council International (ACI), International Cruise Lines Association (CLIA), International Air Transport Association (IATA) and World Tourism and Travel Council (WTTC).

The recommendations are divided into three interrelated blocks:

1) Managing the crisis and mitigating its consequences (preserving jobs; supporting the liquidity of companies; revising taxes and fees related to the tourism industry; protecting consumer rights; increasing the digital skills of tourism business workers; including tourism in general strategies for saving the economies of various regions and states, creation of anti-crisis management mechanisms);

2) Stimulating the accelerated recovery of the tourism industry (stimulating investment in tourism; ensuring the preparation of tourists for travel, including with the existing level of risk of pandemics; creating new jobs; taking into account the environmental sustainability of tourist regions; understanding the market and prompt actions in the market of tourist services; increasing the role of marketing;

3) The creation of a special governing body to regulate the restoration of tourism);

4) Preparing for tomorrow (diversifying markets, products, and services, investing in market research and digital transformation systems; improving the efficiency of tourism management at all levels; ensuring preparedness for crisis situations; investing in human capital; moving to a zero-waste economy and adopting sustainable development).

At the end of March 2020, the Government of Georgia identified the sectors of the economy that will be the first to receive state support in connection with the pandemic, including tourism, hotel business, and sanatorium-resort activities. However, we believe that the placement of the so-called “State order”, that is, the placement of infected or quarantined citizens, is not a measure that can ensure the normal recovery and subsequent development of this industry. We think that the following measures would be effective:

1. Providing these industries with a minimum of six months deferral of payments on taxes (excluding VAT), insurance contributions to state extra-budgetary funds,

2. Extending the deadlines for submitting tax returns and settlements by at least three months, and the deadlines for submitting a claim for payment of taxes, fees, and insurance premiums by at least six months,

3. Postponement of the start date of tax audits,

4. Simplification of the procedure for providing organizations with deferrals and installments for the payment of taxes and insurance premiums for a period of up to one year, depending on the volume of reduction in the taxpayer’s income and without accruing interest on the amount of debt.

We would recommend to the National Travel Agency of Georgia to develop a number of post-crisis measures aimed at the fastest possible recovery of the tourism industry, including:

1) Subsidizing costs in order to reduce the cost of a tourism product to make it more affordable for mass tourism after the end of the pandemic,

2) Subsidizing social tourism – organized trips of socially unprotected groups (schoolchildren, students, pensioners),

3) Partial subsidizing of air travel for groups to tourist regions that are inaccessible due to the high cost of the flight,

4) Support for entrepreneurial initiatives to create tourism products, tourism infrastructure facilities, etc. to create additional jobs and increase tourist flow.

With all the negative consequences of the current crisis, it is important to note the following important point: the modern tourism industry has long been on the eve of great changes. The situation resulting from the virus pandemic is likely to only accelerate the impending transformation. So, for example, trends of more active implementation of virtual and augmented reality technologies, as well as the experience economy, will become relevant. The tools to meet the needs of tourists will change. At the same

time, it is important to understand that their needs themselves will remain the same.

Perhaps the tourism market will recover relatively quickly after the pandemic, as people will need positive emotions. Although, of course, it is impossible to give an accurate forecast, especially in the context of projected changes in exchange rates. In addition, it is likely that the approach to life, in general, may change – ways of online remote communication will become commonplace. The segment of digital projects in tourism is becoming more active, which will help the formation of deferred demand and will work when all restrictions on tourist travel are removed.

Indeed, in recent years, the importance of using electronic information systems and platforms in the tourist services market has only increased. The digitalization trend in tourism implies a gradual reorientation of all market participants to the online sphere with a corresponding reorientation of financial flows and the creation of prerequisites for increasing the profitability of the tourism industry. In this regard, at present, the development and promotion of digital products for both traditional and new tourist destinations seem to be a promising direction. For example, the European Tourism Commission (ETC) posted information about a planned digital campaign to promote creative European cities in Belgium, Germany, and Poland in May 2020, and the World Tourism Organization, together with a Spanish university, launched a distance learning program in tourism.

We would recommend the National Travel Agency of Georgia to follow global trends and create a tourism development strategy right now, which would include a wide range of solutions aimed at the development of digital technologies in Georgian tourism, including:

- Introduction and development of multilingual information services for tourists;
- Development and implementation of an electronic tourist card of the guest and a similar mobile application in the cities of Georgia;

- Providing a transparent electronic system for assessing the quality of the offered tourist services;
- Providing an opportunity to get acquainted with cultural and natural attractions, museum exhibitions, tourist routes online;
- Creation and development of augmented reality services for navigating cities and display objects;
- Development of an open data system in the field of tourism;
- Creation of an electronic platform for the involvement of self-employed persons in tourism activities;
- Development of multimedia applications for display objects, audio, and video guide services with the ability to integrate with GPS navigation, using QR codes to generate requests.

Along with the intensification of the use of digital technologies in tourism, one more trend should be noted, which is expected for the first time after the pandemic subsides. It is likely that we will observe something like a virus phobia among tourists, when people simply will not be ready for mass travel, carefully balancing their needs and possible risks. For Georgia, this may mean an increase in the popularity of ecological tourism.

Ecological tourism involves tourists visiting relatively untouched territories by anthropogenic impact, it is aimed at increasing the ecological culture of tourists and creating conditions for the local community to benefit from environmental protection. According to the World Tourism Organization, the share of eco-tours in world tourism today is about 10%. The objects of ecological tourism can be not only natural landscapes but also cultural attractions. There are three main types of ecological tourism: scientific, educational, and recreational, depending on what purpose the tourists pursue. Unlike other types of tourism, ecological tourism requires a minimum amount of infrastructure, which from an economic point of view can be quite profitable.

The World Tourism Organization identifies ecological tourism as one of the priority areas for the

development of tourism in Georgia, which is due to the special natural conditions of our country.

Conclusion

The current crisis in tourism, resulting from the virus pandemic, is unprecedented in terms of expected losses and consequences. The forecasts for the subsequent recovery are very different. Most often, experts call the third quarter of 2021 and later dates when they express their assumptions about when the tourist market will begin to recover. Some experts assume that the way out of the crisis will take several years and we fully agree with this forecast.

In our opinion, by the time the pandemic ends and the borders between countries open, a huge pent-up demand will accumulate in the tourism industry. Domestic tourism is expected to be the first to recover. However, most likely, the purchasing power

of the population will decrease, so the demand for budget tours in their own countries will increase. As for inbound tourism, it may take much longer to recover. In this regard, it makes sense for the players of the tourist market to concentrate their efforts in the segment of domestic travel, studying and promoting potentially promising directions and developing new offers. Along with this, due to the fear of large crowds of people, mass tourism is likely to become more and more individual, the popularity of ecological tourism will increase, which previously had great potential for development in our country.

The crisis will end sooner or later, and the tourism industry will begin to recover. The tourism industry must come together to work together to develop effective responses to global threats that it may face again in the future.

References:

1. A Theory of the Theory of Public Goods; [Electronic resource]. URL: https://cdn.mises.org/rae10_1_1_2.pdf (Access date 01.03.2021) (In English)
2. Smith A. An Inquiry into the Nature and Causes of the Wealth of Nations: Books I, II, III, IV, V. 1999. [Electronic resource]. URL: https://www.ibiblio.org/ml/libri/s/SmithA_WealthNations_p.pdf (Access date 01.03.2021) (In English).
3. World Health Organization, Universal Health Coverage; [Electronic resource]. URL: who.int (Access date 28.02.2021) (In English).
4. World Health Organization, Operational considerations for case management of COVID-19 in health facility and community [Electronic resource]. URL: [WHO-2019-nCoV-HCF_operations-2020.1-eng.pdf](https://www.who.int/publications/i/item/WHO-2019-nCoV-HCF_operations-2020.1-eng)(Access date 10.10.2020) (In English)
5. World Economic Outlook [Electronic resource]. URL: [https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020#:~: text=Global%20growth%20is%20projected%20at, Economic%20Outlook%20\(WEO\)%20forecast.&text=In%202021%20global%20growth%20is,19%20projections%20of%20January%202020](https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020#:~:text=Global%20growth%20is%20projected%20at,Economic%20Outlook%20(WEO)%20forecast.&text=In%202021%20global%20growth%20is,19%20projections%20of%20January%202020). (Access date 01.03.2021) (In English)
6. Gross World Product, [Electronic resource]. URL: [World GDP 2020 – StatisticsTimes.com](https://www.statista.com/statistics/269427/world-gdp-2020/) (Access date 01.03.2021) (In English).

Section 7. Economics, organization and management of enterprises, branches, complexes

<https://doi.org/10.29013/EJEMS-21-2-59-62>

*Dobrovolska Ella Volodymyrivna,
Associate Professor of the Department
of Economics, business, trade and exchange activities
Podilya State Agrarian and Engineering University
E-mail: dobrovolskaella@gmail.com*

IMPROVEMENT OF ECONOMIC RELATIONS IN THE SUGAR BEET SUBCOMPLEX

Abstract. The article considers the need to improve the structure of economic relations in the sugar beet subcomplex. It is suggested to create a single organizational and production chain, starting with logistics and ending with the sale of finished products and the formation of agro-industrial firms. Their structure should include logistics companies, research organizations and experimental companies, beet farms, sugar factories and organizations engaged in the wholesale of finished products etc.

Keywords: sugar beets, beet sowing farms, sugar beet subcomplex, economic relations.

*Добровольская Элла Владимировна
доцент кафедры экономики, предпринимательства,
торговли и биржевой деятельности
Подольский государственный аграрно-технический университет
E-mail: dobrovolskaella@gmail.com*

УСОВЕРШЕНСТВОВАНИЕ ЭКОНОМИЧЕСКИХ ВЗАИМООТНОШЕНИЙ В СВЕКЛОСАХАРНОМ ПОДКОМПЛЕКСЕ

Аннотация. В статье рассмотрена необходимость усовершенствования структуры экономических взаимоотношений в свеклосахарном подкомплексе. Предлагается создать единственную организационно- производственную цепь, начиная с материально-технического обеспечения и заканчивая реализацией готовой продукции и формированием агропромышленных фирм. В их структуру должны входить предприятия материально-технического обеспечения, научно-исследовательские организации и экспериментальные предприятия, свеклосеющие хозяйства, сахарные заводы и организации, которые занимаются оптовой реализацией конечной продукции и тому подобное.

Ключевые слова: сахарная свекла, свеклосеющие хозяйства, свеклосахарный подкомплекс, экономические взаимоотношения.

Организация и усовершенствование экономических взаимоотношений между предприятиями и организациями агропромышленного комплекса является одной из основных составляющих усовершенствования экономического механизма хозяйствования. Решение данной проблемы во все времена было актуальным и имело огромное практическое значение, потому что не отработанность многих вопросов экономических взаимоотношений ведет к противоречиям между производителями сельскохозяйственной продукции и предприятиями обслуживающих и перерабатывающих отраслей. Организация экономических взаимоотношений на современном этапе характеризуется появлением новых форм ведения хозяйства, функционирования рыночных структур, нового уклада, в аграрном секторе [1, С. 106].

Освоение рыночных отношений для многих сельскохозяйственных предприятий оказались сложным и болезненным процессом. Тяжелое экономическое положение сельскохозяйственных предприятий постоянно усиливалось не только монополизмом со стороны предприятий материально-технического обеспечения, обслуживающих и перерабатывающих отраслей, но и диспропорциями, которые в настоящий момент растут из-за изменения сырьевых зон. В конечном итоге это привело к возникновению многих проблем в сфере реализации сельскохозяйственной и перерабатывающей продукции, создало многочисленные препятствия для перехода к нормальным рыночным отношениям. В результате в предприятиях агропромышленного комплекса имеет место низкая фондоотдача, хроническая убыточность и другие негативные явления. В значительной мере это относится к предприятиям свеклосахарного подкомплекса, где и сахарные заводы, и производители сахарной свеклы, оказались в кризисной ситуации.

В основе всех экономических отношений лежат отношения собственности, и они в большинстве случаев влияют на решение коренных проблем взаимоотношений – производства, реализации, цен и тому подобное. Анализ вопросов отношений собственности показывает, что в ходе реформ противоречия между производителями сырья и предприятиями переработки не были решены, а, наоборот, усилились.

Для эффективной организации производства необходимо создать единственную технологическую цепь, начиная с материально-технического обеспечения и заканчивая реализацией готовой продукции. Анализ ситуации, которая сложилась в сахарном подкомплексе, показывает, что сегодня структуры, которые занимаются материально-техническим обеспечением и реализацией готовой продукции, не связанные со сферой производства и переработки. Они заинтересованы в получении максимальной выгоды от временно заключенных соглашений за счет завышения цен на материально-технические ресурсы, осуществление бартерных операций, предоставления кредитов, ссуд, и тому подобное. Производители сырья и переработчики при этом остаются, как правило, в невыгодной ситуации и несут убытки [1, С. 107].

В связи с этим для организации эффективных экономических взаимоотношений в первую очередь необходимо усовершенствовать всю систему производства сахара и структуру сахарного подкомплекса АПК. К этой структуре предлагается включать предприятия сферы материально-технического и технологического обеспечения, предприятия сферы производства сырья, сахарные заводы, предприятия сферы реализации готовой продукции и тому подобное, то есть создать агропромышленные фирмы по производству сахара в каждой свеклосеющей зоне.

Предприятия материально-технического и технологического обеспечения агропромышленных фирм будут заниматься обеспечением предприятий сферы производства сахарной свеклы необходимыми материалами: запчастями, семенами, удобрениями, ядохимикатами, горюче-смазочными материалами и тому подобное за предыдущим заказом хозяйств. Здесь же создается агрономическая и агрохимическая службы для предоставления помощи хозяйствам во внедрении новых технологий, применении удобрений и ядохимикатов, средств борьбы, из болезнями и вредителями. В этой сфере необходимо создать и машинно-технологические станции, которые на договорных принципах будут выполнять работы из предоставления услуг по техническому обслуживанию и ремонту сельскохозяйственной техники [5, С. 35].

В сфере производства необходимо решить два основных вопроса: создание оптимальных сырьевых зон и выбор наиболее эффективных форм организации производства. Для решения первого вопроса в первую очередь необходимо оптимизировать сырьевые зоны сахарных заводов и увеличить объемы производства свеклы в хозяйствах этих зон за счет концентрации и интенсификации производства.

Решение второго вопроса предусматривается в создании отдельных кооперативов и организаций по производству сахарной свеклы. Их нужно создать как отдельные юридические лица с собственными расчетными счетами в банках. Они могут войти в состав акционерных организаций сахарных заводов и в дальнейшем превратиться в дочерние предприятия агропромышленных фирм.

Перерабатывающие предприятия будут заниматься принятием сырья на переработку, переработкой и реализацией продукции. При каждой зоне сахарных заводов целесообразно создать Совет акционеров агропромышленной фирмы и ревизионную комиссию. Вопросы реализации сахара должны решаться Советом. Реализация должна организовываться за результатами маркетинговых

исследований лишь за одним каналом – через созданные предприятия сферы реализации.

С созданием таких новых структурных подразделений возникнет необходимость в организации принципиально новых связей и экономических взаимоотношений между предприятиями и подразделениями разных сфер. В их основу должна лечь взаимная экономическая заинтересованность и ответственность в исполнении договорных обязательств и заказов. В этом плане наиболее прогрессивной формой экономических отношений являются длительные хозяйственные связи, которые закреплены долгосрочными межхозяйственными договорами. Заключение договоров должно сопровождаться предоставлением расчетов на приобретение необходимых ресурсов. Это приведет к сбалансированному и пропорциональному развитию предприятий разных сфер агропромышленной фирмы. Таким образом, будет создаваться гарантия четкого функционирования единственной технологической цепи, начиная от материально-технического обеспечения производства и заканчивая реализацией продукции.

В системе экономических взаимоотношений вопрос о ценах является одним из важнейших. Последующее совершенствование ценообразования должно учитывать качество сельскохозяйственного сырья. Высокое качество сырья позволяет экономить труд и материальные ресурсы, а в конечном итоге обеспечивает высокий выход конечной продукции – сахара. Система ценообразования на сахарную свеклу, с учетом и стимулирующей повышения качества, должна способствовать росту производства сахара, доходов свеклосеющих хозяйств, сахарной промышленности, народного хозяйства, в целом [3, С. 61].

Для более объективного учета качества сырья мы предлагаем создать сырьевые лаборатории самостоятельные, независимые ни от завода, ни от хозяйств. Эти оснащенные современным оборудованием лаборатории будут быстро и точно определять качество сахарной свеклы [2, С. 16].

Важным показателем качества сырья является общая загрязненность. Ежегодно со свеклой на приемные пункты вывозится огромное количество плодородной почвы. Повышенную засоренность земель и растительной массой имеет сахарная свекла, которая выращивается по индустриальной технологии. За последние годы значительно выросли поставки свеклы без ручной доочистки корней. В связи с этим целесообразно ввести доплату за каждый процент снижения за-

грязненности и поощрять за это механизаторов, которые заняты на уборочных работах.

Таким образом, систему экономических взаимоотношений в сахарном подкомплексе необходимо совершенствовать по всему комплексу организации производства и переработки сахарной свеклы, которые будут способствовать стабилизации обеспечения населения собственным сахаром и повышению эффективности деятельности предприятий свеклосахарного подкомплекса.

Список литературы:

1. Добровольская Э. В. Пути совершенствования взаимоотношений между партнерами свеклосахарного комплекса. Научный вестник НАУ, 2000. – № 23. – С. 106–108.
2. Бондарь В. С., Заяц Н. П. Качество стимулировать ценой. Сахарная свекла, 1978. – № 11. – С. 15–18.
3. Заец А. С. Рынок сахара: проблемы теории и практики. – К.: Научная мысль, 1998. – 315 с.
4. Ёмцев В. И. Обеспечение конкурентоспособности предприятий свеклосахарного подкомплекса в условиях конкурентной среды: монография. – К.: КОМПРИНТ, 2013. – 476 с.
5. Коденская М. Е., Василец Н. М. Межотраслевые связи в свеклосахарном производстве. Экономика АПК, 1996. – № 10–11. – С. 34–39.

<https://doi.org/10.29013/EJEMS-21-2-63-67>

Elizabeth Ni,
Academy for Allied Health Science
E-mail: lizni499@gmail.com; xxjnicole@hotmail.com

FINANCIAL WORRIES OVER MEDICAL COST AMONG ADULTS

Abstract

Aim: This study aims to 1) examine the predictors of adults' financial worries over medical cost in 2017 2) build a predictive model for adults' financial worries over medical cost using artificial neural network and compare its performance to logistic regression model.

Method: The National Health Interview Survey (NHIS) in 2017 was used. All the participants who were eligible were randomly assigned into 2 groups: training sample and testing sample. Two models were built using training sample: artificial neural network and logistic regression. Receiver operating characteristic (ROC) were calculated and compared for these two models for their discrimination capability.

Results: About 26.4% of 26031 Adults had Financial worries over medical cost, about 28.2% among the female and 24.3% among the male. According to the logistic regression, the male was 19.6% less likely than the female to have financial worries over medical cost. The non-Hispanic adults were 55.2% less likely to have financial worries over medical cost than Hispanic adults. Married people were 12.3% less worried. White were 10.7% less worried and Black population were 31.8% more worried. Compared to residents in Northeast, people in Midwest (12.0%), South (28.0%) and West (11.0%) were more worried about the medical cost. Compared to people who were not employed but looking, people who were employed (29.4%) or not employed and not looking (46.5%) were less worried. According to this neural network, the most important predictors was age, sex, working status and race. For training sample, the ROC was 0.61 for the Logistic regression and 0.67. In testing sample, the ROC was 0.60 for the Logistic regression.

Conclusions: In this study, we identified several important predictors for parents' financial worries over medical cost in 2017 e.g., age, gender, race and working status. The findings can help identify people at higher risk of having the financial worries over medical cost.

Keywords: Financial worries, medical cost, logistic regression, model.

1. Introduction:

According to the most recent data available from the Centers for Medicare and Medicaid Services (CMS), "the average American spent \$9,596 on healthcare" in 2012, which was "up significantly from \$7,700 in 2007." It was also more than twice the per capita average of other developed nations, but still, in 2015, experts predicted continued sharp increases: "Health care spending per person is ex-

pected to surpass \$10,000 in 2016 and then march steadily higher to \$14,944 in 2023."

American adults' biggest financial worry is the inability to pay the medical costs in the event of a serious illness or accident, reports Gallup in new survey data. A majority (54%) of the more than 1,000 US adults surveyed said they're either very (30%) or moderately (24%) worried about this.

This study aims to 1) examine the predictors of adults' financial worries over medical cost in 2017; 2) build a predictive model for adults' financial worries over medical cost using artificial neural network and compare its performance to logistic regression model.

2. Data and Methods:

2.1 Data:

The National Health Interview Survey (NHIS) is the principal source of information on the health of the civilian noninstitutionalized population of the United States and is one of the major data collection programs of the National Center for Health Statistics (NCHS) which is part of the Centers for Disease Control and Prevention (CDC). The National Health Interview Survey (NHIS) Data 2017 was used in this study.

2.2 Models:

We used logistic regression models to calculate the predicted risk. Logistic regression is a part of a category of statistical models called generalized linear models, and it allows one to predict a discrete outcome from a set of variables that may be continuous, discrete, dichotomous, or a combination of these. Typically, the dependent variable is dichotomous and the independent variables are either categorical or continuous.

The logistic regression model can be expressed with the formula:

$$\ln(P/P-1) = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \dots + \beta_n * X_n$$

A package called "neuralnet" in R was used to conduct neural network analysis. The package neuralnet focuses on multi-layer perceptrons (MLP, Bishop, 1995), which are well applicable when modeling functional relationships.

The outcome variable is percentage of How worried are you right now about not having enough money for Medical Cost? (ASIRETR)

3. Results

About 26.4% of 26031 Adults had Financial worries over Medical Cost, about 28.2% among the female and 24.3% among the male.

Basically, a corrgram is a graphical representation of the cells of a matrix of correlations. The idea is to display the pattern of correlations in terms of their signs and magnitudes using visual thinning and correlation-based variable ordering. Moreover, the cells of the matrix can be shaded or colored to show the correlation value. The positive correlations are shown in blue, while the negative correlations are shown in red; the darker the hue, the greater the magnitude of the correlation.

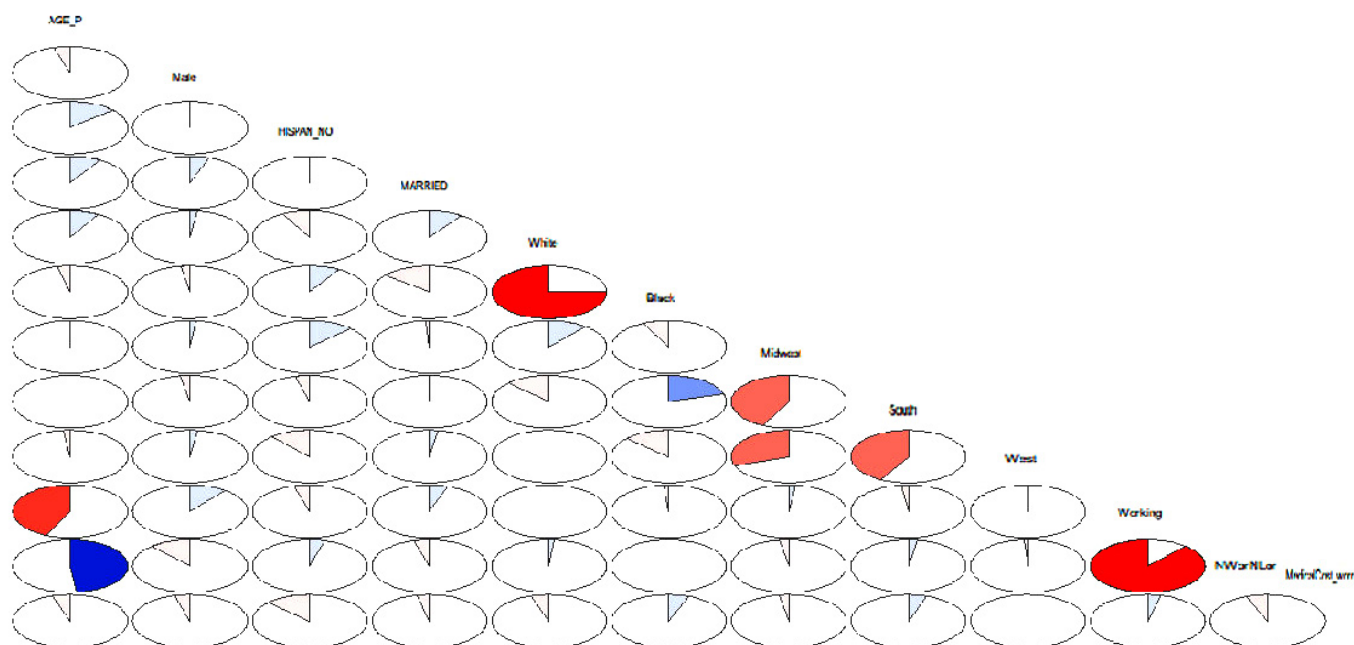


Figure 1. Matrix of correlations between variables

Table 2. – Logistic Regression for Having Financial worries over Medical Cost

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	0.156	0.097	1.600	0.110	
AGE_P	0.000	0.001	0.107	0.915	
Male	-0.219	0.029	-7.519	0.000	***
HISPAN_NO	-0.802	0.041	-19.613	0.000	***
MARRIED	-0.131	0.029	-4.456	0.000	***
White	-0.113	0.056	-2.017	0.044	*
Black	0.276	0.068	4.075	0.000	***
Midwest	0.113	0.048	2.377	0.017	*
South	0.247	0.044	5.635	0.000	***
West	0.104	0.048	2.167	0.030	*
Working	-0.348	0.058	-6.025	0.000	***
NWorNLor	-0.625	0.062	-10.128	0.000	***

According to the logistic regression, the male was 19.6% less likely than the female to have financial worries over medical cost. The non-Hispanic adults were 55.2% less likely to have financial worries over medical cost than Hispanic adults. Married people were 12.3% less worried. White were 10.7% less worried and Black population were 31.8% more

worried. Compared to residents in Northeast, people in Midwest (12.0%), South (28.0%) and West (11.0%) were more worried about the medical cost. Compared to people who were not employed but looking, people who were employed (29.4%) or not employed and not looking (46.5%) were less worried.

Table 2 a. – Odds Ratio and Risk Increase Based on the Logistic Regression

	Estimate	Odds Ratio	Risk Increase
(Intercept)	0.156	116.9%	16.9%
AGE_P	0.000	100.0%	0.0%
Male	-0.219	80.4%	-19.6%
HISPAN_NO	-0.802	44.8%	-55.2%
MARRIED	-0.131	87.7%	-12.3%
White	-0.113	89.3%	-10.7%
Black	0.276	131.8%	31.8%
Midwest	0.113	112.0%	12.0%
South	0.247	128.0%	28.0%
West	0.104	111.0%	11.0%
Working	-0.348	70.6%	-29.4%
NWorNLor	-0.625	53.5%	-46.5%

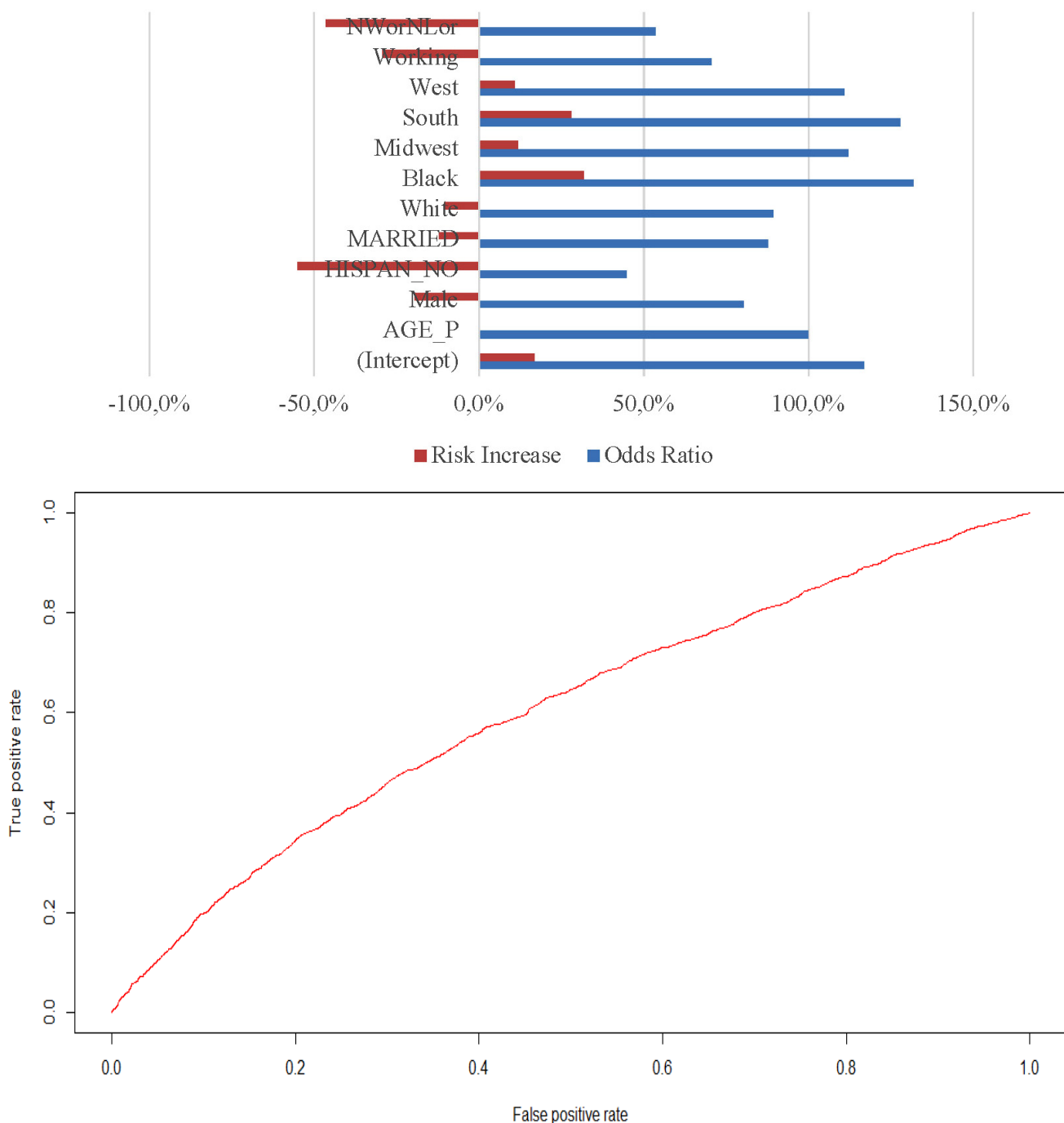


Figure 4: ROC in training sample for Logistic Regression

4. Discussion

This study aimed to 1) examine the predictors of adults' financial worries over Medical Cost in 2017; 2) build a predictive model for adults' financial worries over Medical Cost using artificial neural network and compare its performance to logistic regression model.

About 26.4% of 26031 Adults had Financial worries over Medical Cost, about 28.2% among the female and 24.3% among the male.

According to the logistic regression, the male was 19.6% less likely than the female to have financial worries over medical cost. The non-Hispanic adults were 55.2% less likely to have financial worries over medical

cost than Hispanic adults. Married people were 12.3% less worried. White were 10.7% less worried and Black population were 31.8% more worried. Compared to residents in Northeast, people in Midwest (12.0%), South (28.0%) and West (11.0%) were more worried about the medical cost. Compared to people who were not employed but looking, people who were employed (29.4%) or not employed and not looking (46.5%) were less worried. According to this neural network, the most important predictors was age, sex, working status and race.

For training sample, the ROC was 0.61 for the Logistic regression and in testing sample, the ROC was 0.60 for the Logistic regression.

There are limitations in this study. For example we did not include the health conditions in this study when examining the factors of the financial worries of the medical cost. Health status could be a important factor for this topic and should be included in the future analysis when feasible.

In this study, we identified several important predictors for parents' financial worries over medical Cost in 2017 e.g., age, gender, race and working status. We built a predictive model using artificial neural network as well as logistic regression to provide a tool for early detection.

References:

1. Bloom E. Here's How Much the Average American Spends on Health Care. 2017. [Electronic resource]. URL: <https://www.cnbc.com/2017/06/23/heres-how-much-the-average-american-spends-on-health-care.html> (Access date: 25. 03. 2021).
2. Marketing Charts. Here are American's Top Financial Concerns. 2017. [Electronic resource]. URL: <https://www.marketingcharts.com/industries/education-77468/> (Access date: 25. 03. 2021).
3. Peng C.J., Lee K.L., Ingersoll G.M. An Introduction to Logistic Regression Analysis and Reporting. *The Journal of Educational Research*,– 96(1). 2002.– P. 3–14.
4. Tabachnick B. and Fidell L. *Using Multivariate Statistics* (4th Ed.). Needham Heights, MA: Allyn & Bacon. 2001.
5. Stat Soft, *Electronic Statistics Textbook*. [Electronic resource]. URL: <http://www.statsoft.com/textbook/stathome.html>. (Access date: 25. 03. 2021).
6. Stokes M., Davis C. S. *Categorical Data Analysis Using the SAS System*, SAS Institute Inc. 1995.
7. The National Health Interview Survey (NHIS) Data. 2017. [Electronic resource]. URL: https://www.cdc.gov/nchs/nhis/about_nhis.htm (Access date: 25. 03. 2021).

Section 8. Economic theory

<https://doi.org/10.29013/EJEMS-21-2-68-75>

*Siqi Zhao,
Bellevue High School
E-mail: siqiz0917@gmail.com;
xxjnicole@hotmail.com*

MEAN VARIANCE PORTFOLIO OPTIMIZATION – INSIGHTS DURING THE COVID-19 PERIOD

Abstract

Modern portfolio theory argues that an investment's risk and return characteristics should not be viewed alone, rather, they should be evaluated by how the investment affects the overall portfolio's risk and return. MPT shows that an investor can construct a portfolio of multiple assets that will maximize returns for a given level of risk. Likewise, given a desired level of expected return, an investor can construct a portfolio with the lowest possible risk. Based on statistical measures such as variance and correlations, an individual investment's performance is less important than how it impacts the entire portfolio.

Thus, in this project, we will perform the mean variance portfolio of the targeted portfolio with diagonal adjusted covariance matrix methodology which can give us robust estimation. Then we will use the optimal portfolio to visualize the efficient frontier and compare the optimal portfolio with index or other randomly chosen portfolio.

Keywords: Modern portfolio theory, Mean Variance Portfolio Optimization, investment, diagonal adjusted covariance matrix methodology.

Introduction

The mean-variance analysis is the process of finding optimal asset allocation that provides the best trade-off between the expected return and risk (measured as the variance of returns). A key concept connected to the mean-variance analysis is the Efficient Frontier – a set of optimal portfolios providing the highest expected portfolio return for a given level of risk – or framing it differently – providing the minimum level of risk for the expected portfolio return.

Here are some basic explanations of the important variables:

Portfolio Expected Return: weighted average of the returns of each asset in the portfolio.

Volatility: measurement of the risk of an asset (Each asset volatility will be calculated by the standard deviation of the asset log return).

Risk Aversion: investor's personalized tolerance to risk. The larger the risk aversion, the more conservative the investors will be. Generally, the risk aversion ranges from 0 to infinity.

Methodology Overview

1. Objective Function

In general, portfolios have two objectives: to maximize returns and minimize risk. The goal of optimization is therefore to find a balance that tends to maximize returns or minimize risk, depending on the investor’s risk aversion. Assuming that there are n assets in the portfolio, R is the rate of return for the entire portfolio.

Objective function:

$$\begin{aligned} & \text{maximize } E(R) - aw^T \Sigma w \\ \leftrightarrow & \text{maximize } r^T w - aw^T \Sigma w \end{aligned}$$

Where w is the asset weights in the portfolio ($w \in [0,1]$), a is the risk aversion, Σ is the return covariance matrix.

2. Constraints

The most critical constraint is that the weight of the asset adds up to 1.

$$\sum_{i=1}^n w_i = 1$$

You can specify a weight limit for each asset.

3. Define Risk Aversion Value

There are some common utility functions:

- Exponential utility function
 $U(w) = -e^{-aw}; a > 0;$
- Logarithm utility function
 $U(w) = \ln(w); w > 0;$
- Power utility function
 $U(w) = \frac{w^{1-b}}{1-b}; b > 0; w > 0, b \neq 1.$

Utility functions can be used to determine an investor’s level of risk aversion – the larger the recess of the utility function (i.e., the more negative $U''(w)$) represents the greater the amount of wealth that needs to be added in order to increase a unit of utility. This demonstrates that the investor is more risk averse.

4. Optimization Calculation

With above objective function and the introduction of risk aversion, we can transform the objective function into following form:

$$\begin{aligned} & \text{minimize } \frac{1}{2} w^T \Sigma w - \frac{1}{a} r^T w \\ & \text{subject to } e^T w = 1 \end{aligned}$$

where e is a vector contains all elements as 1. Let’s denote $\lambda = 1/a, \lambda > 0$.

Now the KKT condition is:

$$\begin{aligned} 0 &= \Sigma w - \lambda w - \gamma e \\ e^T w &= 1 \end{aligned}$$

With above two equations, we can have:

$$\gamma = \frac{1 - \lambda w^T \Sigma^{-1} e}{e^T \Sigma^{-1} e}$$

$$\text{Denote } w1 = \frac{\Sigma^{-1} e}{e^T \Sigma^{-1} e} \text{ and } w2 = \frac{\Sigma^{-1} w}{e^T \Sigma^{-1} w}$$

Then the optimal solution of the whole system should be:

$$w_{opt} = (1 - k)w1 + kw2$$

Where $k = \lambda w^T \Sigma^{-1} e$

Model Construction Work Flow

We first provide a procedure overview of the model construction: (Figure 1).

1. Data Source

The monthly return data for five stocks was extracted from Google Finance with the stock tickers: MCD, SBUX, ZM, COST, HSTRF

The necessary data is the daily adjusted closing price of the asset, if the unadjusted closing price is used, the yield needs to be adjusted according to the stock dividend, stock split and other events, so as to avoid causing abnormal return

2. Stock Data Overview

- Log Return Distribution (Figure 2).

Ideally, although the algorithm does not require the data to follow the normal pattern, the log return of each stock is approximately normally distributed which makes it can suit wider situations of optimization.

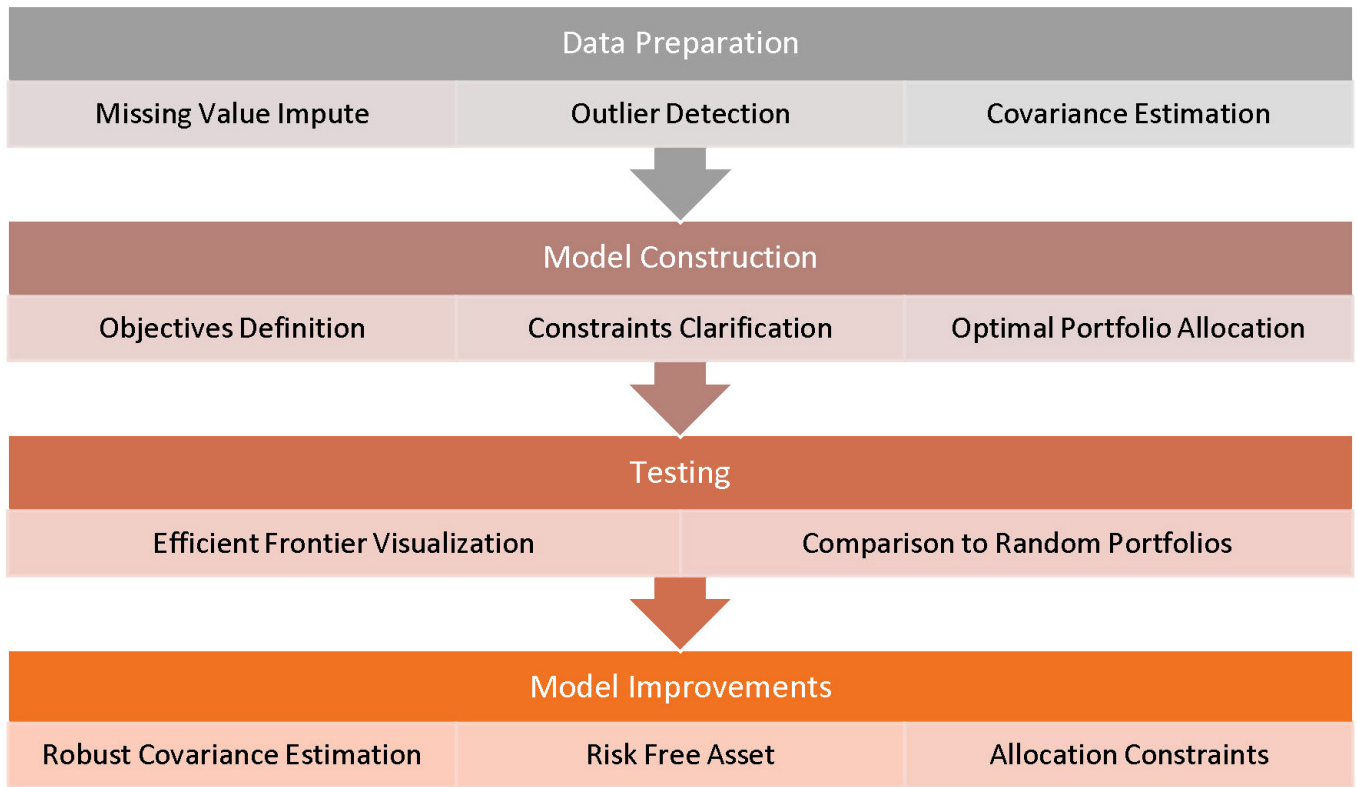


Figure 1.

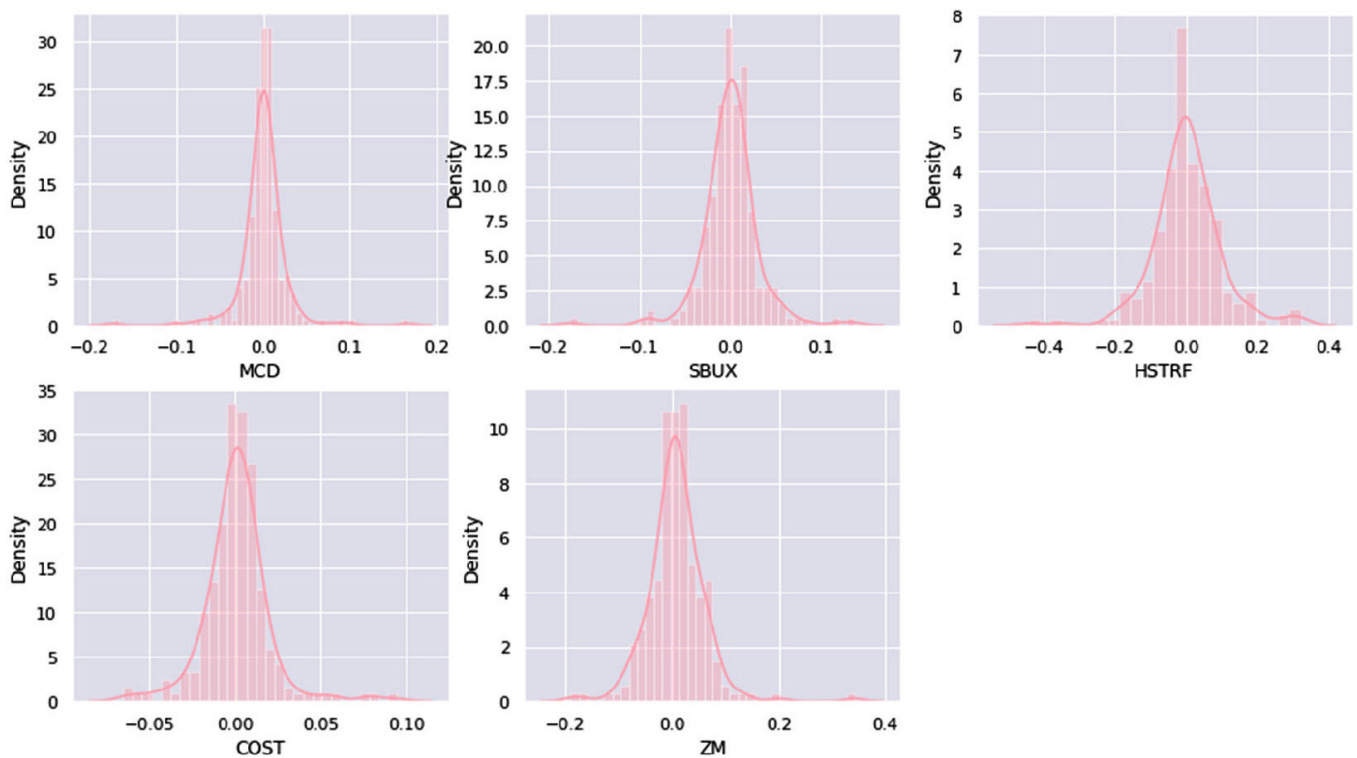


Figure 2.

Ideally, although the algorithm does not require the data to follow the normal pattern, the log return of each stock is approximately normally distributed

which makes it can suit wider situations of optimization.

- Stock Price Time Series.

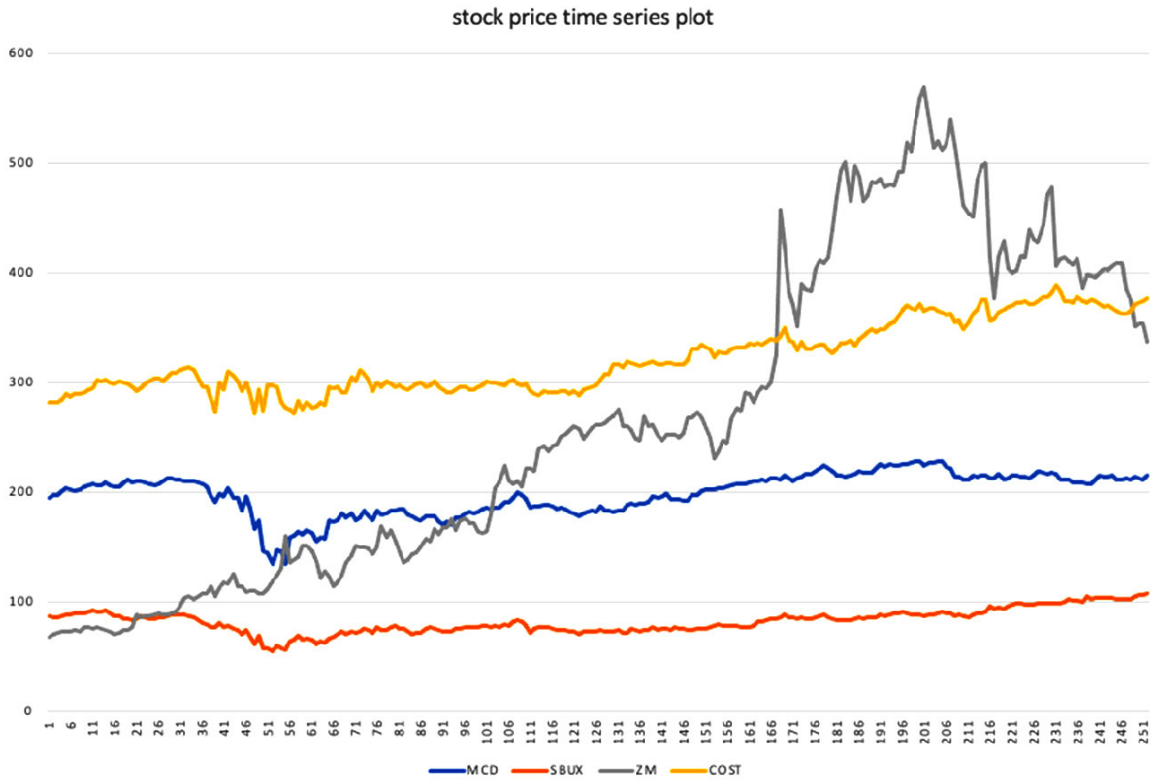


Figure 3.



Figure 4.

With these time series plot, some information has already been revealed. During the Covid 19 period, Zoom company got a sharp increase due to the lifestyle changes. Among the businesses and schools, people are mostly switching from offline to online communication methods, thus, technology developed by Zoom gets more exposure to the market.

Meanwhile the Hollister Biosciences Inc also shows an increase during later period since the vaccine becomes the one of most promising solution which can help humans get rid of the virus attack.

What can be foreseen is that if investors are seeking high return during this Covid time, the above two stocks should be a great choice.

3. Data Preprocessing

- The log return is calculated from the current price and the previous month's adjusted closing price.
- The missing value of return can be replaced by the historical average rate of return (Note: it is not recommended to replace the missing price data directly with the average price)
- Return values which are outside than 3 standard deviations are removed directly as outlier values (This can be adjustable for known return distributions)
- The return co-variance matrix estimation:

Highly related assets can have a significant impact on optimization results. Here we give two ways to adjust the yield co-variance matrix calculated using historical data.

(1) Diagonal adjustment – A very small number (e.g. 0.001, 0.005) is added uniformly to the main diagonal of the yield co-variance matrix, thus ensuring that the result error is not magnified when we inverse the matrix.

(2) Ledoit-Wolf shrinkage – Using Ledoit-Wolf shrinkage method to acquire robust covariance matrix estimation.

4. Optimizer Construction

We are using python and package scipy which provides a convenient API to build all kinds of minimization problem structure. Then the constraints are introduced by adding inequality or equality.

Here we restricted every asset has upper bound allocation percentage of 30% and has lower bound allocation percentage of 0%, which means no short sells are allowed.

Model Results

1. Optimal Portfolio

Here is the information about the optimizer results:

Optimization terminated successfully. (Exit mode 0)

Current function value: -0.00299274725150995

Iterations: 10

Function evaluations: 70

Gradient evaluations: 10

And the optimal portfolio allocation is:

Stock Ticker	Optimal Weights Risk Aversion=2	Optimal Weights Risk Aversion=5	Optimal Weights Risk Aversion=10
MCD	5.81%	16.71%	20.11%
ZM	66.88%	30.00%	28.75%
COST	12.59%	20.51%	23.15%
SBUX	3.85%	14.86%	18.13%
HSTRF	10.87%	9.96%	9.86%

Optimal Portfolio Information:

	Portfolio Return	Portfolio Risk
Risk Aversion = 2	0.58%	5.30%
Risk Aversion = 5	0.36%	3.60%
Risk Aversion = 10	0.296%	3.31%

2. Efficient Frontier

The efficient frontier is the set of optimal portfolios that offer the highest expected return for a defined level of risk or the lowest risk for a given level of expected return. Portfolios that lie below the efficient frontier are sub-optimal because they do not provide enough return for the level of risk. Portfolios that cluster to the right of the efficient frontier are sub-optimal because they have a higher level of risk for the defined rate of return.

The efficient frontier will possess following attributes:

(1) Any point on the effective frontier represents an optimal portfolio with a given asset weight, and of course there are some portfolios within the effective frontier, but given a portfolio P within the effective frontier, a portfolio P within the effective frontier can always find a combination with the same volatility as P but a higher expected return. Therefore, in order to maximize the benefits, investors will always choose a combination of effective frontier. Ultimately, the best portfolio points move along the effective frontier based on different risk aversion values.

(2) When limiting the maximum weight of an asset or applying other weight constraints, the efficient frontier shape may change accordingly.

The efficient frontier of current portfolio: (Figure 5).

From the plots we see that with our current risk aversion = 2, risk aversion=5, and risk aversion=10, the optimal portfolio is shown as the red point on each of the plots. And the global optimal can reach about 5.30%, 3.60%, and 3.31% of portfolio volatil-

ity and about 0.58%, 0.36%, and 0.296% of expected return, respectively. Conclusively, as the risk aversion factor increases, the expected return decreases, while the portfolio volatility increases, indicating that the more risk an investor can bear, the more return he/she will typically receive.

Our optimal portfolio is always exactly lying on the efficient frontier. This means that with the same risk, our optimal portfolio will always have higher return than the other portfolios. The higher the risk aversion, the lower the return and risk will be. We can deduct that when risk aversion=infinity, the optimal portfolio will become the global minimum risk portfolio

Further Improvement

1. Covariance Estimation Improvements

The covariance matrix estimation is extremely sensitive to data quality and usually results in an unstable estimation which cause problem when shaping the efficient frontier. Thus, one method is to use Ledoit-Wolf shrinkage method to estimate robust covariance matrix.

2. Add Free Risk Asset

The Markowitz model is used for the allocation of risk assets in this case, and in practice risk-free assets can be added to find the optimal allocation point more precisely. This will become the classical CAPM model.

3. Precise Asset Allocation Specification

Add asset specific allocation upper bound, lower bound and group allocation can further help investors to decide precise weights they want to achieve.

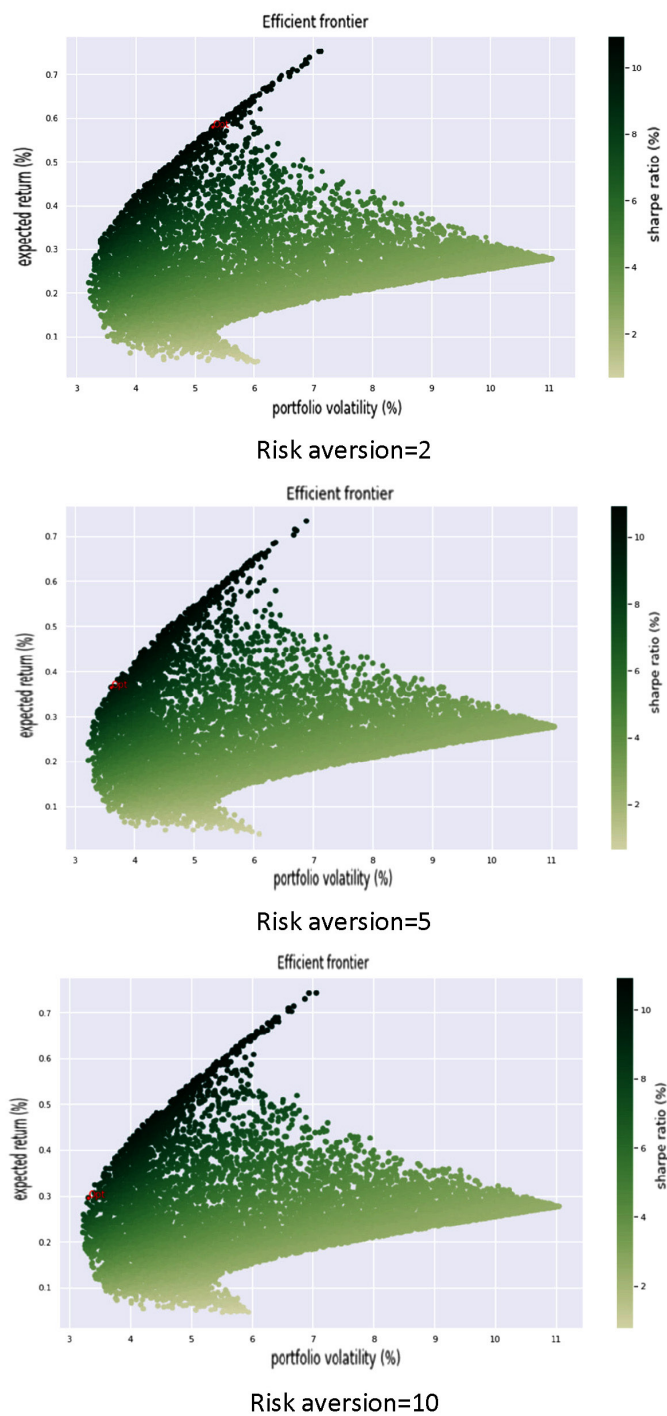


Figure 5.

Conclusion

Based on the actual financial market, this project has coded the traditional Markowitz asset allocation model. This is an asset optimization method based on risk aversion factors, yields and volatility. This asset allocation model can be used for a variety of

asset types, such as stocks, bonds, or indices. The allocation of asset weights for the next period is optimized based on the previous return and volatility of the asset. Markowitz asset allocation model is a financial gain/risk trade-off, which lays a solid theoretical foundation for CAPM model.

Generally, when the risk aversion factor increases, the portfolio return would decrease while the risk would decrease. For instance, based on the portfolio optimization results, when the risk aversion is set to 2, the portfolio return is 0.58%, and the risk is 5.30%, whereas when the risk aversion is set to 10, the portfolio return decreased to 0.296%, and the risk lowered to 3.31%.

Stock allocation is easily affected by the risk aversion factor. Using stock MCD as an example, when the risk aversion factor is set to be 2, the stock allocation is 5.81%, while when the risk aversion factor is set to be 10, its stock allocation increases to 20.11%, indicating that MCD is a relatively low-risk stock investment. This can also be indicated by the stock price time series plot, in which the MCD stock price curve is comparatively flat. Accordingly, when the risk aversion factor increases, the percent allocation of low-risk stock increases, similarly, when the risk aversion factor decreases, the percent allocation of low-risk stock decreases.

When deciding to invest in different stocks, people should calculate and decide their personalized risk aversion factor based on their current financial situation. Since the expected return and risk can vary as the risk aversion factor varies, establishing their most fit risk aversion factor would find the best balance between expected return and risk for their own situation. To better avoid high risks, people should not put their eggs in the same basket, specifically, they should choose different investments with varying levels of risks. Financial investment can also be related with political and societal changes. For example, the corona virus has significantly impacted the stock market, causing most of the stock prices to fall dramatically. Moreover, the government subsidy can cause inflation, thus also shifting, mostly raising, the overall stock price.

Summary

When allocating assets, it is essential to find a balance between profits maximization and risk minimization. Understanding that the investors are risk-averse, we recommended them to distribute their portfolio into various asset classes with different levels of risk. Supposedly, losses in one investment will be covered by the profits earned in other investments.

The ideal assets allocation strategy can help people maintain and increment their wealth, with the preliminary understanding that no investment is risk-free, however, there are some investments with lower risk and some others with higher risk. To avoid spending all the assets in one investment, we will set an upper and a lower allocation bound.

References:

1. Ledoit Olivier and Michael Wolf. “Improved estimation of the covariance matrix of stock returns with an application to portfolio selection.” *Journal of empirical finance* – 10.5. 2003. – P. 603–621.
2. Roll Richard. “A mean/variance analysis of tracking error.” *The Journal of Portfolio Management* – 18.4. 1992. – P. 13–22.
3. Mangram Myles E. “A simplified perspective of the Markowitz portfolio theory.” *Global journal of business research* – 7.1. 2013. – P. 59–70.
4. Virtanen Pauli et al. “SciPy 1.0: fundamental algorithms for scientific computing in Python.” *Nature methods* – 17.3. 2020. – P. 261–272.
5. Google Finance: Stock market quotes, news, currency conversions & more. (n.d.). Google. Retrieved October 11, 2020. From: URL: <http://www.google.com/finance>
6. Erlich István, Ganesh K. Venayagamoorthy, and Nakawiro Worawat. “A mean-variance optimization algorithm.” *IEEE Congress on Evolutionary Computation*. IEEE, 2010.

<https://doi.org/10.29013/EJEMS-21-2-76-81>

*Xu Jonathan,
Dover-Sherborn High School, MA
E-mail: skyjxu@gmail.com;
xxjnicole@hotmail.com*

MEAN VARIANCE PORTFOLIO OPTIMIZATION

Abstract. Mean-Variance Model (Modern portfolio theory) maybe the most famous model in financial field. It assesses a portfolio which's the expected return (mean) is maximized under a given risk (variance). It comes from assumption that investor want as high as return while as low as risk as he could when he invested a couple of assets (a portfolio is the collection of many assets). This model could give us the many optimal portfolio (efficient portfolio frontier) when we know every asset's expect return and their covariance matrix. The accuracy estimating the covariance matrix is the most essential part implementing portfolio optimization.

Thus, in this project, we will perform the mean variance portfolio of the targeted portfolio with Ledoit-Wolf shrinkage methodology which can give us robust estimation of covariance matrix. Then we will use the optimal portfolio to visualize the efficient frontier and compare the optimal portfolio with index or other randomly chosen portfolio.

Keywords: Mean-variance model, financial, portfolio, optimal, Ledoit-Wolf shrinkage methodology.

I. Introduction

This project provides an introduction to mean-variance analysis and the capital asset pricing model (CAPM). We begin with the mean-variance analysis of Markowitz (1952) when there is no risk-free asset also discuss the difficulties of implementing mean-variance analysis in practice and outline some approaches for resolving these difficulties. Because optimal asset allocations are typically very sensitive to estimates of expected returns and covariances, these approaches typically involve superior or more robust parameter estimation methods. Mean-variance analysis leads directly to the capital asset pricing model or CAPM. The CAPM is a one-period equilibrium model that provides many important insights to the problem of asset pricing. The language / jargon associated with the CAPM has become ubiquitous in finance.

1 Financial Concepts

- Expected Return: The expected return on portfolio assets is a weighted average of the

returns of each asset in the portfolio, often used with a log returns and simple rates of return. Since the return of financial assets are mostly in the distribution pattern of peaks and thick tails, the quantitative models mostly use the log return.

- Volatility: Volatility is used to measure the risk of an asset, the standard deviation of the return sequence. For portfolios, volatility is the standard deviation of the return on the whole portfolio.
- Assets Correlation: If there is a positive correlation between the two assets (correlation coefficient $\rho > 0$), the price and rate of return between the two assets will change in the same direction, and if there is a negative correlation (correlation factor $\rho < 0$), the price and rate of return between the two assets will change in reverse." As a result, negative-related assets tend to hedge

some of the risk, reducing the overall risk to the portfolio.

- Sharpe Ratio: That is, the profitability of the asset, calculated as:
- Sharpe = (expected return – risk-free interest rate) / volatility
- The higher the Sharp ratio, the greater the benefit of a unit of risk.

2. About Investors

- Utility Function: The utility function is a function on $R \rightarrow R$, and if the wealth is w , $U(w)$ represents the utility (satisfaction) that the investor obtains from w ; Typically, the utility function $U(w)$ should meet the following criteria:

(1) The more wealth you have, the more utility you have, i.e. $U'(w) > 0$;

(2) Increased wealth and decreasing marginal utility, i.e. $U''(w) < 0$;

(eg: Wealth increases from \$1 to \$2 and the utility is greater than wealth increases from \$100 to \$101)

Generally, the utility function will look like as this type of shape:

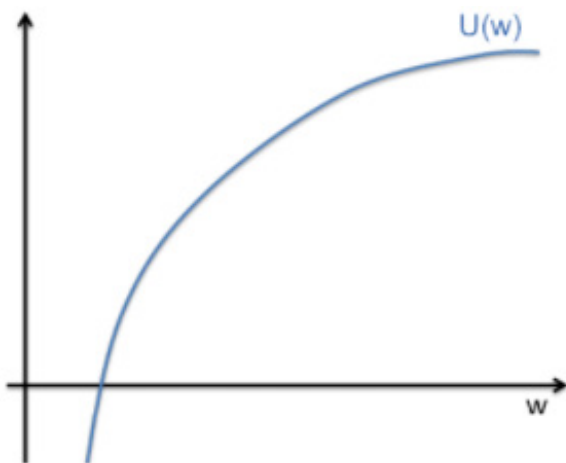


Figure 1.

Utility function normal shape

- Risk Aversion: Starting from utility function, we can define an investor’s risk aversion coefficient. Risk aversion coefficient is an extremely important parameter in asset allocation, which reflects the investor’s personalized tolerance to

risk. The use of ‘a’ to represent the risk aversion factor represents an increase in the minimum expected rate of return required by investors for each more unit of risk assumed.

eg: Let risk and expected return be used as the minimum unit of 1%, then $a = 5$ means that investors require a return increase of at least 5% to be willing to take an additional 1% risk.

The greater the risk aversion factor, the more conservative the investor is. In general, the risk aversion factor should be greater than zero.

II Methodology Overview

1. Objective Function

In general, portfolios have two objectives: to maximize returns and minimize risk. The goal of optimization is therefore to find a balance that tends to maximize returns or minimize risk, depending on the investor’s risk aversion. Assuming that there are n assets in the portfolio, R is the rate of return for the entire portfolio.

Objective function:

$$\text{maximize } E(R) - aw^T \Sigma w$$

$$\leftrightarrow \text{maximize } r^T w - aw^T \Sigma w$$

Where w is the asset weights in the portfolio ($w \in [0,1]$), a is the risk aversion, Σ is the return covariance matrix.

2. Constraints

The most critical constraint is that the weight of the asset adds up to 1.

$$\sum_{i=1}^n w_i = 1$$

You can specify a weight limit for each asset.

3. Define Risk Aversion Value

There are some common utility functions:

- Exponential utility function $U(w) = -e^{-aw}; a > 0$;
- Logarithm utility function $U(w) = \ln(w); w > 0$;
- Power utility function $U(w) = \frac{w^{1-b}}{1-b}; b > 0; w > 0, b \neq 1$.

Utility functions can be used to determine an investor’s level of risk aversion – the larger the recess of the utility function (i.e., the more negative $U''(w)$) represents the greater the amount of wealth that needs to be added in order to increase a unit of utility. This demonstrates that the investor is more risk averse.

4. Optimization Calculation

With above objective function and the introduction of risk aversion, we can transform the objective function into following from:

$$\begin{aligned} &\text{minimize } \frac{1}{2} w^T \Sigma w - \frac{1}{a} r^T w \\ &\text{subject to } e^T w = 1 \end{aligned}$$

where e is a vector contains all elements as 1. Let’s denote $\lambda = 1/a, \lambda > 0$

Now the KKT condition is:

$$\begin{aligned} 0 &= \Sigma w - \lambda w - \gamma e \\ e^T w &= 1 \end{aligned}$$

With above two equations, we can have:

$$\gamma = \frac{1 - \lambda w^T \Sigma^{-1} e}{e^T \Sigma^{-1} e}$$

$$\text{Denote } w1 = \frac{\Sigma^{-1} e}{e^T \Sigma^{-1} e} \text{ and } w2 = \frac{\Sigma^{-1} w}{e^T \Sigma^{-1} w}$$

Then the optimal solution of the whole system should be:

$$w_{opt} = (1 - k) w1 + k w2$$

$$\text{Where } k = \lambda w^T \Sigma^{-1} e$$

III Model Construction

We first provide a procedure overview of the model construction:



Figure 1.

1. Data Source

The monthly return data for six stocks was extracted from Google Finance with the stock tickers: HSY, AAPL, DIS, GOOG, WMT, KO

The necessary data is the daily adjusted closing price of the asset, if the unadjusted closing price is used, the yield needs to be adjusted according to the stock dividend, stock split and other events, so as to avoid causing abnormal return

2. Data Preprocessing

- The log return is calculated from the current price and the previous month's adjusted closing price.
- The missing value of return can be replaced by the historical average rate of return (Note: it is not recommended to replace the missing price data directly with the average price)
- Return values which are outside than 3 standard deviations are removed directly as outlier values (This can be adjustable for known return distributions)
- The return co-variance matrix estimation:

Highly related assets can have a significant impact on optimization results. Here we give two ways to adjust the yield co-variance matrix calculated using historical data.

(1) Diagonal adjustment – A very small number (e.g. 0.001, 0.005) is added uniformly to the main diagonal of the yield co-variance matrix, thus ensuring that the result error is not magnified when we inverse the matrix.

(2) Ledoit-Wolf shrinkage – Using Ledoit-Wolf shrinkage method to acquire robust covariance matrix estimation.

3. Optimizer Construction

We are using python and package scipy which provides a convenient API to build all kinds of minimization problem structure. Then the constraints are introduced by adding inequality or equality.

Here we restricted every asset has upper bound allocation percentage of 30% and has lower bound allocation percentage of 0%, which means no short sells are allowed.

IV Model Results

1. Optimal Portfolio

Here is the information about the optimizer results: Optimization terminated successfully. (Exit mode 0)

Current function value:
-0.0058981090972642005
Iterations: 9
Function evaluations: 72
Gradient evaluations: 9

Table 1. – And the optimal portfolio allocation is:

Stock Ticker	Optimal Weights		
	Risk Aversion = 2	Risk Aversion = 5	Risk Aversion = 8
GOOG	0.001934	0.016806	0.016806
DIS	0.220275	0.168186	0.168186
HSY	0.182630	0.229654	0.229654
WMT	0.128743	0.237038	0.237038
KO	0.000000	0.081874	0.081874
AAPL	0.466418	0.266442	0.266442

Table 2. – Optimal Portfolio Information:

	Portfolio Return	Portfolio Risk
Risk Aversion = 2	1.36%	6.20%
Risk Aversion = 5	1.15%	4.72%
Risk Aversion = 8	1.06%	4.41%

2. Efficient Frontier

The efficient frontier is the set of optimal portfolios that offer the highest expected return for a defined level of risk or the lowest risk for a given level

of expected return. Portfolios that lie below the efficient frontier are sub-optimal because they do not provide enough return for the level of risk. Portfolios that cluster to the right of the efficient frontier are

sub-optimal because they have a higher level of risk for the defined rate of return.

The efficient frontier will possess the following attributes:

(1) Any point on the effective frontier represents an optimal portfolio with a given asset weight, and of course there are some portfolios within the effective frontier, but given a portfolio P within the effective frontier, a portfolio P within the effective frontier can always find a combination with the

same volatility as P but a higher expected return. Therefore, in order to maximize the benefits, investors will always choose a combination of effective frontier. Ultimately, the best portfolio points move along the effective frontier based on different risk aversion values.

(2) When limiting the maximum weight of an asset or applying other weight constraints, the efficient frontier shape may change accordingly.

The efficient frontier of current portfolio:

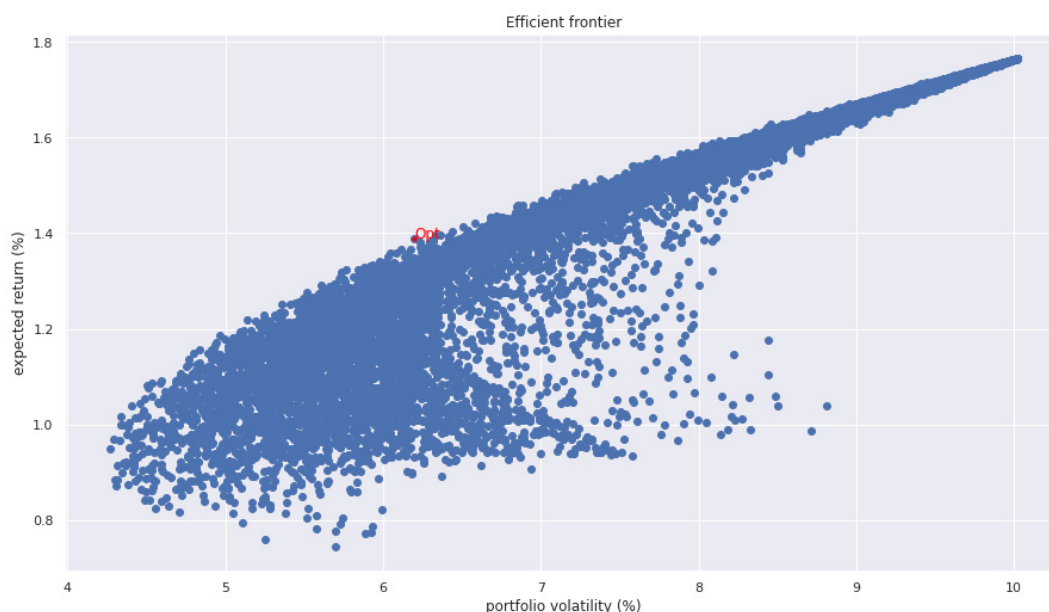


Figure 2.

From the plot we see that with our current risk aversion = 2, the optimal portfolio is shown as the red point on the plot. And the global optimal can reach about 6.2% of portfolio volatility and about 1.36% expected return.

V Further Improvement

1. Improve data preprocessing procedure

- Increasing the frequency of data acquisition can effectively improve the accuracy of volatility forecasts (e.g., using daily rather than monthly earnings data);
- Using Ledoit-Wolf's estimated covariance matrix. For Sample covariance S and true covariance matrix Σ , this method will find a

coefficient k such that can minimize $E[\|\Sigma^* - \Sigma\|]$, where $\Sigma^* = kS + (1-k)I$.

2. Model improvement

- Efficient Frontier formulation: When randomly generated and weighted for an asset of 1, a common approach is to divide n randomly generated numbers by their sum and force them to sum to 1. This method can be used in generating valid boundaries, but as the number of assets increases, it will be difficult to generate some more extreme weighting situations, resulting in valid boundaries not being fully drawn. This is because the n weights generated by this method are not evenly distributed on the n -dimensional

- Add risk-free assets: The Markowitz model is used for the allocation of risk assets in this case, and in practice risk-free assets can be added to find the optimal allocation point

more precisely. After adding risk free asset, the efficient frontier won't change but there should be a tangent point with risk free market line.

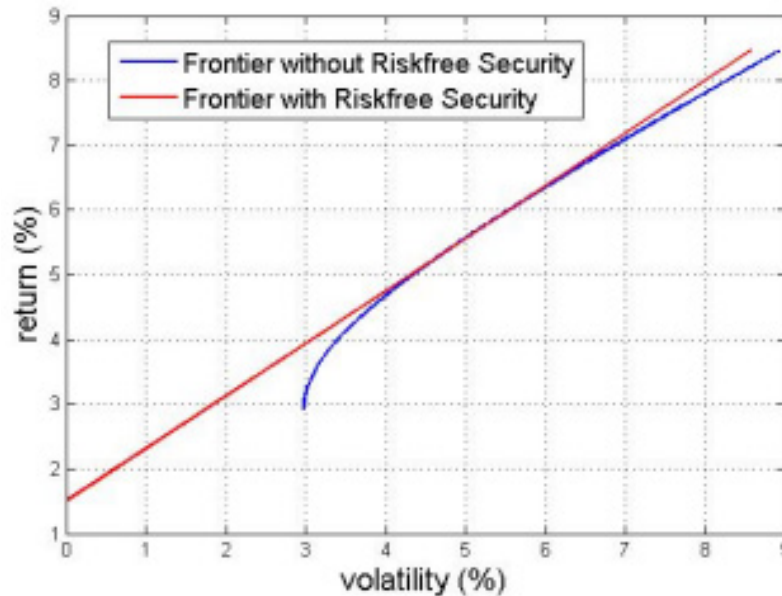


Figure 3.

VI. Conclusion

Based on the actual financial market, this project has coded the traditional Markowitz asset allocation model. This is an asset optimization method based on risk aversion factors, yields and volatility. This asset allocation model can be used for a variety of

asset types, such as stocks, bonds, or indices. The allocation of asset weights for the next period is optimized based on the previous return and volatility of the asset. Markowitz asset allocation model is a financial gain/risk trade-off, which lays a solid theoretical foundation for CAPM model.

References:

1. Ledoit Olivier and Michael Wolf. "Improved estimation of the covariance matrix of stock returns with an application to portfolio selection." *Journal of empirical finance* – 10.5 2003. – P. 603–621.
2. Roll Richard. "A mean/variance analysis of tracking error." *The Journal of Portfolio Management* – 18.4. 1992. – P. 13–22.
3. Mangram Myles E. "A simplified perspective of the Markowitz portfolio theory." *Global journal of business research* – 7.1. 2013. – P. 59–70.
4. Virtanen Pauli et al. "SciPy 1.0: fundamental algorithms for scientific computing in Python." *Nature methods* – 17.3. 2020. – P. 261–272.
5. Google Finance: Stock market quotes, news, currency conversions & more. (n.d.). Google. Retrieved October 11, 2020. From: URL: <http://www.google.com/finance>
6. Erlich István, Ganesh K. Venayagamoorthy, and Nakawiro Worawat. "A mean-variance optimization algorithm." *IEEE Congress on Evolutionary Computation*. IEEE, 2010.

Contents

Section 1. Marketing	3
<i>Wu Yiheng</i> BIG DATA PROJECT – BANK MARKETING CAMPAIGN	3
Section 2. Mathematical and instrumental methods of economics.	16
<i>Jerry Xiang</i> AMAZON FINANCIAL MODEL	16
Section 3. Management	29
<i>Kavtadze Edward</i> STRATEGIC DIRECTIONS OF PERSONNEL MANAGEMENT DEVELOPMENT	29
<i>Rostiashvili Tamar, Soselia Maya, Podiashvili David</i> MODERN VALUES OF SERVICE MANAGEMENT AND BOUNDARIES OF THE SUBJECT AREA	32
<i>Khmiadashvili Nino</i> KEY ASPECTS OF QUALITY MANAGEMENT IN THE HOTEL BUSINESS	35
<i>Chechelashvili Maia, Malania Elizabeth, Berikashvili Leah</i> CHANGING MANAGEMENT PARADIGMS	39
Section 4. Regional economy	43
<i>Sugiyarsih Susi, Suwitri Sri, Larasati Endang, Ngatno</i> QUALITY OF TAX SERVICE AT PRATAMA CIREBON ONE TAX SERVICE OFFICE	43
Section 5. Regional economy	51
<i>Budniak Liubov Mykolaivna</i> BASIC METHODOLOGICAL ASPECTS OF ANALYSIS OF INNOVATIVE ACTIVITY OF ENTERPRISES	51
Section 6. Economics of recreation and tourism	55
<i>Akimishvili Nino</i> THE COVID-19 PANDEMIC AND ITS IMPACT ON THE TOURISM INDUSTRY AND HOSPITALITY	55
Section 7. Economics, organization and management of enterprises, branches, complexes	59
<i>Dobrovolska Ella Volodymyrivna</i> IMPROVEMENT OF ECONOMIC RELATIONS IN THE SUGAR BEET SUBCOMPLEX	59
<i>Elizabeth Ni</i> FINANCIAL WORRIES OVER MEDICAL COST AMONG ADULTS	63
Section 8. Economic theory	68
<i>Siqi Zhao</i> MEAN VARIANCE PORTFOLIO OPTIMIZATION – INSIGHTS DURING THE COVID-19 PERIOD	68
<i>Xu Jonathan</i> MEAN VARIANCE PORTFOLIO OPTIMIZATION	76