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Wage-Productivity Analysis of U.S. Domestic Airlines

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RSCH 202: Intro to Research Methods

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Abstract

This study examines the impact of wages on productivity by examining US domestic airlines. Current literature places emphasis on jobs conducted in-flight, specifically pilots and cabin crew. This paper considers all job titles involved in the operations of the airline, including executives and management. Existing research focuses on factors such as governance, domestic economic level, and personal attributes such as intrinsic motivation, gender, and age. There is insufficient research regarding the relationship between wage and productivity. Thus, it is uncertain if high wage leads to high productivity. Preliminary findings suggest higher wage equates to higher productivity.

Keywords: *Productivity, Wages, US domestic Airlines, Revenue per Employee*

Introduction

Oftentimes a measure of an employee's productivity is based on their salary. Although a justified statement, it is only valid if every single employee is accounted for within the company. The limelight of the aviation industry always shone upon pilots and cabin crew, thanks to their ability to experience the romance of flying first-hand. Because of this, behind-the-scenes workers are overlooked despite being instrumental in ensuring the smooth operation of any flight. These workers include check-in counter staff, baggage loaders, and flight support staff. Airline management is not acquitting by placing too much emphasis on pilots and cabin crew, often constructing business strategies entirely around flying related activities and staff. Therefore, airline management needs to be aware of the bigger picture by accounting for ground and flight support staff. Doing so will allow an airline to drive revenue by improving productivity and efficiency.

Literature review

The Economic Policy Institute (2019) mentioned that American citizens understand that the economy should expand like how a rising tide should lift all boats, where everyone should reap the rewards of an expanding economy. Where the average workers' wage should rise in value together with productivity. However, is wage the only factor that improves the growth of productivity? Would personal attributes such as age, gender, or motivation affect the employee's productivity levels? Would the economic level or the involvement of the state aid in the relationship between wage level and productivity? There are various studies done with a wide variation of answers provided. Therefore, this research will provide an in-depth look into the impact of wage level on productivity.

Personal Attributes

Money is a great motivator for any individual in any industry. One would assume that a higher salary equates to a highly productive employee. However, the salary may not be the only factor affecting productivity. A study by Becchetti et al. (2013) found out that intrinsic motivations are important drivers of productivity. The data was collected in 2006 by a pool of six universities through questionnaires. It consisted of 4,134 employees, 338 managers that came from 320 Italian cooperatives. The results that were achieved by Becchetti et al. (2013) shows that non-profit workers are shown to get paid significantly less than the ones from the for-profit industry. This actively promotes the donative-labour hypothesis which explains that intrinsically motivated workers are more inclined to receive non-monetary compensation with the knowledge of sacrificing part of their wages. Workers that receive a lower level of wage are clustered with individuals that are either motivated intrinsically (prepared to accept a lower salary to achieve a social goal) or motivated extrinsically (accepted a job in the non-profit sector as a second option). A study done by Jelstad (2007) found that there was a higher performance in a non-profit organization as compared to a for-profit organization, however, it was seen that there was no difference for intrinsic motivation for both sectors.

With that being said, other factors such as age and gender do play a part in the productivity of employees. The National Academies Press (2012) states that older employees are more productive due to the experience and knowledge gained throughout their careers. This experience carries over to their labour output. The quality of their labour output is higher as experienced employees are more familiar with the processes and are aware of the expectations that are required of them. Greater experience also leads to processes and tasks being accomplished at a quicker pace; thus, it can be said that greater experience yields higher employee productivity.

Gender is a factor that might impinge on the productivity of employees. There are physical and psychological differences between each gender. Kotur and Anbazhagan (2014) state that males are more effective as compared to females when labour-intensive work is required, this is due to their biological differences. Putting labour-intensive work aside, Kotur and Anbazhagan experimented to find out if gender genuinely affected productivity. This experiment was conducted in India and utilized random sampling and questionnaires as its methodology. Workers and managers were randomly selected, and the managers rated their worker's performance on a scale from 1 to 5, with 5 being the best and 1 being the worst. This data collection period lasted for a month. The results of the experiment showed that female workers were more productive than their male counterparts. However, the authors also brought up the limitations of the study. These limitations include, amongst the entire workforce of the company, more female employees could have been randomly selected as compared to male employees. This means that more female employees were participating in the experiment, thus the results of the experiment would show that female workers were more productive as compared to their male counterparts. It can also be argued that in places like India, where gender discrimination is prevalent, women have to be more productive in their work to continue being employed.

Governance

The government is responsible for providing the framework to any organization which wishes to conduct business within the country. In creating a foundation to protect the country's citizens against mistreatment at the workplace, employees may in turn become more productive. After analysing feedback on work conditions in eighteen different Latin American countries from the Gallup World Poll of 2007, Chaparro & Lora (2016) concluded there was a positive relationship between working conditions and productivity. Additionally, Jokipalo (2019) made an

interesting discovery by experimenting on Basic Income (BI) through five sessions on seventy-six candidates. Amadeo (2020) explains that BI is a guaranteed payment from the government. The purpose of BI is to cover the basic cost of living and provide financial reassurance. Contrary to popular belief, introducing BI treatment exponentially increased employee productivity. The actions of the US Government corroborate these findings, with an observed increase in the minimum wage in twenty-one states in 2020, fourteen of which were motivated through previously approved legislation or ballot initiatives (Draeger, 2020)

Domestic Economic Level

The domestic economic level and the infrastructure of a country plays a huge role in the wage level and productivity of the workers. A higher domestic economic level would allow the companies in that country to be able to invest more in infrastructure and technologies that would increase worker productivity. As seen in Policardo et al. (2019), an increase in GDP per capita would allow for more investment in new technologies which increases worker productivity. This is also seen in Behrens et al. (2014), which states that larger regions have higher wages and higher productivity.

Behrens et. al (2014) also asserts that both wages and productivity is affected by barriers to trade between borders. After the removal of border restrictions between the United States and Canada, the researchers found that there was an increase in both labour income share between 2.18% and 6.18% and an increase of productivity of 4.36% in Canada and a 1.05% increase in productivity and a negligible change in wages in the United States. However, one limitation of this study is that it would be incredibly hard to be able to test the claims of the researchers since eliminating trade barriers between countries would be almost impossible.

Research Question

How will salary affect employee productivity in the aviation industry?

Theoretical Framework

Several different factors affect a worker's productivity. The key independent variable in this study will be the worker's wages. According to Behrens et. al. (2014), barriers of trade between countries have an impact on worker productivity. In Chaparro and Lora (2016), there is also a positive relationship between working conditions and productivity. Intrinsic motivations are important drivers of productivity according to Becchetti et al. (2013). By accounting for these variables in our study, we should be able to arrive at the impact of productivity with increases in wages. Also, several other variables such as government policy, domestic infrastructure and trade are controlled for since our research only aims to look at airlines within the United States.

Hypothesis

Null hypothesis. There is no association between an employee's productivity and their salary in the aviation industry.

Alternate hypothesis. There is an association between an employee's productivity and their salary in the aviation industry.

Study Design

The research topic that our team is focusing on would be the relationship between salary and productivity in the aviation industry, specifically in US-based airlines that are similar in size and outreach domestically. Thus, the type of study that we will be utilizing would be a causal experiment as we are researching the impact of two main variables and their cause and effect relationship. The type of data that we will collect would be secondary data from government and non-governmental sources, this involves data of airlines from the Massachusetts Institute of

Technology (MIT) and the National Conference of State Legislatures (NCSL). Data collection would be done through secondary quantitative research methods such as through data available online, from many different sources such as educational institutions, and public libraries. The data would then be analysed through a regression analysis to determine the level of impact and interaction between each variable.

Our research question would be, "How will salary affect employee productivity in the aviation industry?".

The significance of the data analysed would then be placed through both a null and alternate hypothesis.

H0: There is no association between an employee's productivity and their salary in the aviation industry.

H1: There is an association between an employee's productivity and their salary in the aviation industry.

Population and Sample

The chosen population for our report will be focused on 4 United States domestic airlines, namely JetBlue, Spirit, Allegiant, and Southwest. These airlines have been chosen to best represent the U.S. demographic within all regions. We will sample their data on revenue per employee for the years 2010 till 2019. The descriptive statistics are included, and the data is selected on the grounds that all four of the airlines are compared fairly. The secondary data provided online by the Massachusetts Institute of Technology (MIT) contains data before 2010. However, due to the sporadic missing information, it has formed an unbalanced panel. To mitigate this, sample data from 2010 onwards is used to achieve a balanced panel and more reliable analysis.

Variables and Measures

The dependent or outcome variable is the productivity of the employees, which will be assessed through the revenue per employee. Revenue per employee is an important variable that approximately assesses the income generated by all employees of the company. To determine a company's revenue per employee, the company's total revenue must be divided by the total number of employees.

The independent variables, also known as explanatory variables, are the average wage of the employees, employment title, state laws on wages, and extrinsic motivation of employees. Another dummy variable included is the region of each U.S. domestic airline headquarters. As previously stated, the four chosen airlines are, JetBlue from New York, Allegiant from Nevada, Spirit from Florida, and Southwest from Texas. These airlines represent one corner of the U.S. Since we need to determine if wage affects the productivity of employees, the average wage of the employees is an important independent variable. The average wage can be calculated by adding up all the wages of a specific department of employees and then dividing by the total number of employees in that department. Employment title should also be considered as it consists of nominal data such as managerial titles, pilots and co-pilots, flight attendants, maintenance, all non-cockpit staff, and passenger and cargo handling. Employees of different employment titles earn different salaries. For example, a pilot could earn more than a flight attendant, thus this has to be taken into consideration as well. The average wage is also related to the employment title as employees of a certain department could have a higher average wage than another department. Another variable that affects the average wage is state laws on wages. In the United States, each state has a different minimum wage. For example, according to the U.S Department of Labor (2020), Texas has a basic minimum rate of USD 7.25 per hour while New York has a basic minimum rate of USD 11.80 per

hour. Therefore, this is another variable that ought to be considered. Extrinsic motivation is an additional variable which may affect the productivity of employees to a certain extent, hence we included it within the equation to control for its effects. Employees may be motivated to gain more monetary rewards, resulting in an increase in their productivity. Extrinsic motivation can be measured through employee benefits, pensions, and payroll taxes.

Data Collection Methods

The first set of data collected will be secondary data compiled by the Massachusetts Institute of Technology (MIT), based on their Airline Data Sets from the MIT Global Airline Industry Program. The data in use consists of the four airlines' passenger revenue per employee from 2010 to 2019. The descriptive statistics are reflected below.

Table 1

Descriptive Statistics of the four Airlines' Wages

Allegiant Air									
Pilots & Co-Pilots		Flight Attendants		Maintenance		Passenger, Cargo and Aircraft Handling		Other	
Mean	1266.47072	Mean	1014.16561	Mean	2681.70622	Mean	2161.02666	Mean	2369.33202
Standard Error	65.5032502	Standard Error	71.4531125	Standard Error	278.281242	Standard Error	163.927314	Standard Error	163.158347
Median	1255.90987	Median	1068.10292	Median	2491.53885	Median	2123.17725	Median	2360.33895
Standard Deviation	207.139465	Standard Deviation	225.954581	Standard Deviation	880.002555	Standard Deviation	518.383683	Standard Deviation	515.951997
Jetblue Airways									
Pilots & Co-Pilots		Flight Attendants		Maintenance		Passenger, Cargo and Aircraft Handling		Other	
Mean	2023.60252	Mean	1720.70211	Mean	7449.06682	Mean	944.918582	Mean	2667.72356
Standard Error	25.2434269	Standard Error	58.8334079	Standard Error	184.124233	Standard Error	35.7819559	Standard Error	138.262959
Median	2022.3907	Median	1735.26699	Median	7679.03564	Median	974.431213	Median	2830.25103
Standard Deviation	79.826725	Standard Deviation	186.047571	Standard Deviation	582.251949	Standard Deviation	113.15248	Standard Deviation	437.225866
Southwest Airlines									
Pilots & Co-Pilots		Flight Attendants		Maintenance		Passenger, Cargo and Aircraft Handling		Other	
Mean	2244.19131	Mean	1391.81873	Mean	7947.06565	Mean	893.557611	Mean	3610.32473
Standard Error	44.4373683	Standard Error	39.1226577	Standard Error	153.630519	Standard Error	19.3748197	Standard Error	91.1236509
Median	2248.83788	Median	1354.61791	Median	8009.38598	Median	881.206453	Median	3555.57528
Standard Deviation	140.523297	Standard Deviation	123.716706	Standard Deviation	485.822358	Standard Deviation	61.2685596	Standard Deviation	288.158286
Spirit Airlines									
Pilots & Co-Pilots		Flight Attendants		Maintenance		Passenger, Cargo and Aircraft Handling		Other	
Mean	1022.52544	Mean	684.784144	Mean	4757.92627	Mean	3273.01687	Mean	6038.87013
Standard Error	52.8032547	Standard Error	50.0736263	Standard Error	303.371427	Standard Error	566.704207	Standard Error	1015.57751
Median	1062.03411	Median	707.321435	Median	4784.2284	Median	3326.10974	Median	4977.1877
Standard Deviation	166.978553	Standard Deviation	158.34671	Standard Deviation	959.344688	Standard Deviation	1792.07605	Standard Deviation	3211.53806

The second set of data collected will be secondary data provided by the National Conference of State Legislatures (NCSL), involving the minimum wage of each airlines' home state from 2010 to 2019. The four states involved are Florida, Nevada, New York, and Texas. The minimum wage for each state can be found in Table 1.

Table 1*Minimum Wage for Airlines' Home States between 2010 and 2019*

Year	Florida	Nevada	New York	Texas
2019	\$8.46USD	\$8.25USD	\$11.10USD	\$7.25USD
2018	\$8.25USD	\$8.25USD	\$10.40USD	\$7.25USD
2017	\$8.10USD	\$8.25USD	\$9.70USD	\$7.25USD
2016	\$8.05USD	\$8.25USD	\$9.00USD	\$7.25USD
2015	\$8.05USD	\$8.25USD	\$8.75USD	\$7.25USD
2014	\$7.93USD	\$8.25USD	\$8.00USD	\$7.25USD
2013	\$7.79USD	\$8.25USD	\$7.25USD	\$7.25USD
2012	\$7.67USD	\$8.25USD	\$7.25USD	\$7.25USD
2011	\$7.31USD	\$8.25USD	\$7.25USD	\$7.25USD
2010	\$7.25USD	\$7.55USD	\$7.25USD	\$7.25USD

Data Analysis Methods

A regression analysis will be used to analyse the data. This is because there are several different independent variables present in the data. Therefore, a regression analysis is required in order to single out the impact of wages on productivity.

$$y = \alpha + \beta_1 W + \beta_2 T + \beta_3 L + \beta_4 M + \beta_5 S + E$$

The equation above will be used for our regression analysis. W is the average wage of the employees, T is the employment title, L is state laws on wages, S for the state of origin for the airline and extrinsic motivation of employees is represented by M.

Conclusion

The findings of this study cannot be generalised to the rest of the world since only U.S. domestic airlines were chosen. Furthermore, as there are very few airlines within the U.S. that have not opted to conduct international flights, the study is limited to a small pool of four truly domestic U.S. airlines. Additionally, due to limited avenues of productivity measurement such as company-specific Key Performance Indicators (KPIs), and measurements of intrinsic motivations, the analysis is not as complete as it could be. The policy implications for this study would be referenced from the findings. Hence, without a proper finding, there would be two different policy implications following the null and alternate hypothesis. In the event that we accept the null hypothesis, non-monetary incentives should be made mandatory to improve the quality of life of the employees to boost productivity, for example, lower working hours, working from home and providing more leave days. In the event that we reject the null hypothesis and accept the alternate, the policy implication would be to find the point of diminishing returns to maximise productivity through the issuance of salary.

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