The Study of Factors Influencing the Average Wage in Taiwan

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I. Introduction

1.1 Motivation and Background

The stagnation of the average wage in Taiwan has long been discussed. From students who just enter the society to workers who have strived for livings for years, the dissatisfaction of the average wage spreads across the public.

The most crucial thing is—what are the factors that influence the average wage?

Many possible factors were brought up, one of them is the minimum wage—For the sake of public welfare, our government had raised the minimum wage for several times, aiming to uplift the living standard and lower the inequality in our society. However, the implementation of minimum wage policy raises debates between the labors and the companies, even resulting in the resignation of the director of Council of Labor Affairs, ROC in 2012.

In this paper, we will first find out whether a rise in minimum wage will increase the average wage; and, whether higher minimum wage will result in a higher average wage. While some theories have proved that higher minimum wage will raise the overall income level, thus benefiting the economy and improving the average wage, whether our country can be applied to these theories is still doubtful.

Another possible factor that influences average wage is the labor productivity—the labor productivity decides the payment received by the labors.
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Generally, stagnation in average wage may imply stagnation in labor productivity. Apart from the minimum wage, we will also examine the labor productivity in our country to discover whether the productivity is the culprit that encumbers the growth of average wage.

Finally, one of the most important factors influencing the average wage will be the macro economy in our country. The industrial environment has changed dramatically from the 20th to the 21th. Existing industries faded out, and new industries entered. The survival and development of these industries have played important roles in deciding the wages. Thrives in industries will push forward the whole economy, while stagnation in industries will leave the economy in dead water.

Moreover, investments in the industrial environment decide the potential of the industrial growth, since investments are resources that the industry can make use of. To conclude, these factors in macro economy are critical to examine the growth of average wage and are what we are mainly focus on.

1.2 Purpose of Study

✓ To find out whether a rise in minimum wage will affect the average wage in Taiwan

✓ To discover wage-related factors in Taiwan

II. Literature Review
2.1 The Implementation of Minimum Wage

In the past decades, most of researches support the implementation of minimum wage. Card and Krueger did a series of studies involving standard economic theory to the test, using data from a series of recent episodes, including the 1992 increase in New Jersey's minimum wage, the 1988 rise in California's minimum wage, and the 1990-91 increases in the federal minimum wage. In each case they present a battery of evidence showing that increases in the minimum wage lead to increases in pay, but no loss in jobs. MW would not reduce the employee rate but improve our economy and income level (David Card and Alan B. Krueger, 1997). Since then, lots of economics indicates that the MW policy would have positive effects.

2.2 The Effects of Minimum Wage

In addition, In 1995, Hui Lin Wu investigate many employees and use Granger causality test to find out that raising one NTD dollar of minimum wage could also raise 0.73 dollar of average wage, which means raise MW could also raise AW (Hui Lin Wu, 1998).

Also, in 2001, Huang Ren De use VAR model to test the minimum wage policy, and the conclusion is that the negative impact of minimum wage is small and is short-term (Huang Ren De, 2001).

Recently, Alan Manning, a head of the Economics Department at the London
School of Economic has made a conclusion that during these ten years, the minimum wage policy in UK has undoubtedly been a success. It has won widespread political support and fame among the public and—even though a surprisingly small fraction of workers are paid it—seems to have had more pervasive effects on wage inequality than one might expect. (Alan Manning, 2012)

III. Methodology

3.1 Minimum Wage

3.1.1 Introduction

1. Taiwan

Taiwan government has set minimum wage policy since 1976. However, the minimum wage was stagnated from 1997 to 2007. Recently the government adjusts minimum wage frequently. Last year, the director of Council of Labor Affairs, ROC resigned from her position, calling for public dissatisfaction for inequality in wage discontent. In 2013, the Executive increased the nation’s minimum monthly wage to NT$19,047 (US$636) and hourly wage to NT$109.

The Council of Labor Affairs, ROC said it is the government’s responsibility to ensure that workers can meet their basic living needs. The minimum wage adjustment, which is expected to benefit 1.7 million workers, will also help push overall salary levels higher. Meanwhile employers must endeavor to raise employee salaries and
improve working conditions. Labor unions may also conduct collective bargaining with employers to arrive at win-win solutions. But there are still some labors and editorials are not satisfied with it and try to force government to raise it higher.

Minimum wage is a crucial issue in Taiwan.

**Figure.1  1968-2013 Minimum Wage Growth in Taiwan**

**Minimum Wage growth from 1968-2013**

2. **The United State**

The lowest level of minimum wage in the United State is determined by the Fed, while other states can set its own level of minimum wage, which cannot be lower than the level the Fed has set.

**Table.1  2007-2012 Minimum Wage data in USA**

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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Table 1 above is the six-year Fed minimum wage in the United State. In 2013, the US government decides to adjust the minimum wage to raise the minimum wage to $9 and will adjust it based on inflation rate. This policy can decrease the time that used to determine the wage, and accelerate the reaction of policy to reality.

3. Korea

In Korea, the executive branch sets the minimum wage. At first, the government requests the Minimum Wage Council to conduct a preliminary deliberation of the minimum wage. Then, the government sets the minimum wage based on the results of the Council’s deliberation. The Minimum Wage Council is composed of a total of 27 councilors: 9 representing workers, 9 representing employers, and 9 representing the public interest.

From 1988, the minimum wage in Korea is growing gradually. Table 2 below is the six-year hourly minimum wage in Korea.

<table>
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<tr>
<th>2007</th>
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<tbody>
<tr>
<td>3480 won</td>
<td>3770 won</td>
<td>4000 won</td>
<td>4110 won</td>
<td>4320 won</td>
<td>4580 won</td>
</tr>
</tbody>
</table>

4. Summary Chart
3.1.2 Examination

To understand what exactly is the condition of minimum wage in Taiwan, and to figure out whether our minimum wage is high or low, first we will look up the ratio of minimum wages to mean earnings of full-time employees from the OECD database, and transfer it into a line chart.

Figure 2  2001-2011 Minimum to Mean

As the figure 2 shows, actually the ratio of minimum wages to mean earnings of
full-time employees in Taiwan performs well, compared to other countries. This high ratio may have two possible explanations, one is that our minimum wage is high enough while the other is that our average wage is relatively low. To find out which one is closer to the truth, we use the following formula to calculate the real wage.

\[
\frac{\text{Nominal Wage}}{\text{PPP US$ (base year:2011)}} = \text{Real Wage (US$ Adjusted)}
\]

In order to find out the real wage, we will use PPP to compare the two currencies. PPP, according to Tim Callen (IMF), is “The rate at which the currency of one country would have to be converted into that of another country to buy the same amount of goods and services in each country”. In this paper, both currencies are compared with US dollar. As Table 3 shows, if every good had equal value in among countries, a US dollar would cost NT$15.53 and Korean Dollar 806.81 in 2012.

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<tr>
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<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>17.91</td>
<td>17.011</td>
<td>16.98</td>
<td>16.43</td>
<td>15.6</td>
<td>15.53</td>
</tr>
<tr>
<td>Korea</td>
<td>757.04</td>
<td>762.16</td>
<td>781.48</td>
<td>799.05</td>
<td>796.02</td>
<td>806.81</td>
</tr>
</tbody>
</table>

Now let’s look back to the equation above, when the nominal wage in both countries are divided by the PPP, we can know the real purchasing power of the
nominal wages. That is, although the “nominal wage” is high in Korea, the “real wage” is lower, since we need more Korean dollar to buy a good that costs $1. By using PPP, we are able to compare several economic indexes in both countries.

First, we will compare the minimum wages between countries in time series from 2007 to 2012. The reason why we chose 2007 as our beginning year is because it is the year Taiwan first set the hourly minimum wage.

Figure.3 2007-2012 Minimum Wage adjusted by PPP

The figure.3 represents the real minimum wage adjusted by PPP per hour. After calculated by PPP, Taiwan’s minimum wage is higher than Korea’s. Some may concern that the minimum wage in Taiwan is fixed for a long time, but why the line goes upward? As we mentioned before, the PPP in Taiwan is decreasing, this contribute to the larger real minimum wage. This condition is not only true in 2012, but also to other years. Generally, Taiwan’s real minimum wage is higher than Korea’s.
The chart shows that the problem may not be in the minimum wage, so we turn to average wage comparison in countries to get the answer.

Figure 4 shows the real average wage, also adjusted by PPP between 2007 and 2012. Despite of Korea’s larger PPP rate, Korea’s real average wage still seems to be higher than Taiwan.

**Figure 4  2007-2012 Average Wage adjusted by PPP**

This outcome shows that the nominal average wage in Korea is well above the nominal average wage in Taiwan. Taiwan’s real average wage performs the worst in three countries during these periods.

**Figure 5  2008-2012 Growth Rate of Average Wage**
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In the average wage chart that showed before, we have found out that the average wage in Taiwan is not in a good condition. To be more precisely, we calculated the growth rate and transfer it into line chart. Although the minimum wage in Taiwan is rising, but the average wage in Taiwan grows slowly compared to Korea, as the graph 5 shows above.

So far we have compared the real minimum and average wage, now that’s take a look into the nominal GDP. As the news reported, we all know that Korea’s GDP per capita is higher than Taiwan. In 2012, Korea’s GDP per capita reached to 23000 dollars, much more than Taiwan’s 20000 dollars.

**Figure 6  2007-2012 Gross Domestic Product adjusted by PPP**
We also adjusted the GDP per capita by PPP. From graph 6 we could see that after adjusted by PPP, Taiwan’s GDP performance is actually better than Korea’s.

To conclude, Taiwan’s GDP performance is better, and the real minimum wage in Taiwan is actually higher, but the real average wage is still smaller than Korea and grows in a low speed. So what’s the problem with Taiwan’s real average wage? What’s the main factors influence the average wage? This is the next step we’re going to figure out in our paper.

3.1 Other Possible Factors

According to our previous research, raising the minimum wage seems not a good solution to increase the low average wage in Taiwan. There are more our government and enterprises should do.
In this section, we aim to find out whether other possible factors result in the stagnation of average wage. We will start from the relation between labor productivity and wage, and later observe the problems of macro economy in Taiwan.

3.1.1 Labor Productivity

According to the definition from OECD, labor productivity is a revealing indicator of several economic indicators as it offers a dynamic measure of economic growth, competitiveness, and living standards within an economy. When labor productivity gets higher, it can stimulate the growth of economy and wages.

Based on the data from Directorate-General of Budget, Accounting and Statistics, ROC, the index of unit labor costs which based on 2006 is getting lower.

**Figure 7 2000-2012 Index of Unit Labor Cost in Taiwan**

![Indexes of unit labor costs](image)

And graph.8 shows the index of labor productivity and total wages, and both of them are getting higher. It seems to be a good trend, but the graph shows that the gap between the index of labor productivity and total wages is also getting larger year by
year.

**Figure 8** 2000-2012 Index of Labor Productivity and Total Wages in Taiwan

Therefore, as the graph shows, low average wage in Taiwan may not result from low labor productivity or high labor cost. Rather, labors in Taiwan may not receive the wage they deserve.

3.1.2 Macro Economy

3.2.2.1 Investment

Investment plays an important role in our economy which can be divided in public and private investment. Both of them relate to the benefits of reducing costs, larger production, and higher competitiveness. With the strong conditions, firms are able to earn more profit, and then stimulate our economy growth and raise the wages. Thus, without investment, the market demand for labor will reduce, causing high
unemployment rate and stagnation of wage. In the following section, we will examine both of the public and private investment in Taiwan.

1. Public Investment

Though public investments have crowding effect on private sector since the market demand is constant in the short run, it can induce more private investment in long run. Public investments contribute to the public capital accumulation, improving transportation and telecommunication, thus enhancing our living standard. Most importantly, these investments can not only lower factories’ cost but also increase production efficiency, encouraging private sector to invest more, thus stimulating the economic growth.

But the truth is that our public investment divided by GDP is getting lower stage by stage as the graph.9 shows.

**Figure.9  1990-2012 Public Investment divided by GDP in Taiwan**
Insufficient public investments result in inferior business environment, which deters foreign direct investment. Low investment can also lead to unsound infrastructures which support the development of industries. Thus, the reduction of the scale and the growth rate of public investment might be one of the reasons that encumbers the economic growth.

2. **Foreign Direct Investment**

To introduce FDI, we will first discuss the pros and cons of FDI. The disadvantages of FDI are that FDI are always risky because the political situation in some countries can change in an instant. The investor could suddenly find his investment in serious jeopardy due to several different reasons. The risk is always extremely high. Second, if the domestic firms are relatively uncompetitive, they may suffer, and face severe competition with foreign competitors.
On the other hand, the advantages of FDI are that it can stimulate economic activity and boost the development of existing or new industries. It can also force the domestic firms to improve themselves and become more competitive. Since the FDI can be used on founding new business or starting a subsidiary, it may need to hire more employees and thus increasing employment. With the inward of FDI, they may bring in new technology and new management style, giving domestic producers an incentive to become more efficient. Generally, if it is under well-controlled, inward of FDI gives a positive impact on industry.

**Figure 10 1999-2011 Foreign Direct Investment Stock in Taiwan**

The graph above shows the direct investment from foreign country. The blue line represents FDI in Taiwan, while the red one represents FDI in Korea. We can see that although Taiwan’s FDI stock is rising, its growth rate is slow. In fact, the speed
that FDI flows into Korea is about two times faster than Taiwan. And in 2011, the flow of FDI in Taiwan is even a negative value, which means that FDI is outwarding.

To sum up, in the investment part, the performance of public investment and FDI are going backward. Without sufficient investment, firms can’t growth stably and prosperously, and the profit of firms will also be stagnated. Then it's hard for firms to hire more employees or raise the salary. The market demand for labor would reduce, causing high unemployment rate and stagnation of wage.

3.2.2.2 Current Industry

We believe that industrial development has something to do with the wage stagnation, especially average wage. If our industries are not in prosperity, wage can hardly increase in this case. In the following, we will go through the problems in current industries and new industries, and try to figure out the difficulties industry in Taiwan faces. In addition, we are going to focus on electrical machinery and equipment manufacturing industries since the proportion of their export amount has been exceed over one-third of total exports in Taiwan in 2011 as the graph.11 shows.

Figure.11 2011 Proportion of Exports Amount in Different Industries
Due to our observation, we assume a condition of industry offshoring in Taiwan. In the following, we are going to find out WHY and HOW it happens.

1. Technology

Electrical machinery and equipment manufacturing are the key industries in Taiwan. They contribute a great amount of GDP per year. To simplify the question, we will focus on these two industry. As we all know, the technique of manufacturing is an important part of this industry. That’s because the one who hold more core technique, often create more profit.

Figure 12  1999-2011 International Payment data of Taiwan
In the balance of the international payment data of Taiwan, for the sector of royalties and licenses, we create a cash inflow about eight hundreds millions in 2011, but an outflow by nearly six billion. As we can see from the graph, the gap between inflow and outflow is getting larger by years. This gap describes the lack of valuable core technology in Taiwan. It’s unworthy that we pay high fee for knowledge as we manufacture our own product.

2. Investment to China

When the industry gets mature, companies will try to cut down expense. As a result, they will seek the countries that provide the lowest manufacturing cost. And this results in industry offshoring. In the case of Taiwan, PC and electrical manufacturing companies have paved their way to China. The offshoring has taken
away the working opportunity that people in Taiwan should have.

Figure.13  **2002-2011 Investment Amounts to China of Taiwan**

![Figure.13 Investment Amounts to China of Taiwan](image)

Figure.13 describes the soaring amounts of Taiwan’s investment to China, and this highlights the fact that there is lack of money support in our home country Taiwan. And the shortage of investments slows down the development of our existing industry.

Above all, lack of core technology and investment for future development cause negative contribution to industrial environment. When Taiwan loses its comparative advantages, we can hardly uplift our competitiveness, thus falling into stagnation in wage growth.

3. **Factor-Price Equalization Theorem**

We can use factor-price equalization theorem to describe the effect on our wages.
According to the theorem, at the beginning, the price of factors will differ from countries, since the conditions such as workers’ education and reserves of natural resources are different. However, through the movement of products and industries, the price of factors will travel across country border and become homogenous.

In the case of Taiwan and China, due to frequent trades and industrial corporations, as the factors of both countries move across board, the wage growth in Taiwan will be hampered by China’s low wage level.

That is because the current industries in Taiwan do not upgrade due to the stagnation of economic environment, and China is catching up with us as a developing industry. When the people in Taiwan are actually doing their work similar with the Chinese, the theorem works

As mentioned above, there is a challenge in existing industries in Taiwan. Lack of core technology and investment lead to industry offshoring in Taiwan. And industry offshoring causes price equalization of the factor, that is, wages.

**Figure.14  2002-2011 Gross Profit Margin rate of Electrical Industries**
Recently, gross profit margin rate of electrical industries is even less than 4 percent. Whether Taiwan can rely on these industries in the future is a serious question.

3.2.2.3 New Industry

Another possible reason that influences the average wage may be the stagnation of new industry.

Before we talk about the difficulties faced by new industries in Taiwan, we will first look on the Flying Geese model (FG), developed by the Japanese economist Akamatsu Kaname (1986–1974).
FG model indicates the process of a country transferring from a less-advanced one to an advanced one. While in the neoclassical theory, the relation between countries refers to competition, FG model suggests that the relation between countries builds on complemented products and demand linkages among countries.

That is, the import of foreign product raises the demand in home country, thus enticing the local company to produce the product. At first, this product industry in home country can only do half-manufacture, such as producing related components, importing raw materials and manufacturing machines from the foreign countries.

When the industry has developed advanced technology, it can shift from half-production to fully production, meanwhile increasing the imported raw material. In the end, as the domestic production exceeds the domestic demand, home country becomes the one export the product.

In this developing process, an advanced country tries to reach “heterogeneity” to
maintain its leading position, while the less-advanced country achieves “homogeneity”
to catch up with the advanced country. As a result, the advanced country may
differentiate itself from the less-advanced by means of technology innovation, while
the less-advanced country may try to make technological progress to catch up with the
advanced.

This theory is similar to the product cycle theory, yet they are look on different
aspects. In product cycle, when a product develops into a matured one and can be
standardized produced, its production location will shift from the original country to
another country, which acquire comparative advantages in terms of lower cost and
higher manufactured efficiency.

In Asia, Japan is the leading advanced country, obtaining innovative ability to
develop high techniques. Taiwan and Korea follow Japan, applying high technology
to production. Finally, China chases behind, manufacturing low-end products.

Previously, Taiwan’s industry transferred from traditional manufacture industry
to electronic industry, playing an important role in PC production. At that time, 90% of
PC over the world was produced by industry in Taiwan. Low-end technical
threshold as well as high profit attracts many companies to enter the PC OEM.
However, as the cost of manufacturing personal computer become lower, several
companies in Taiwan considered entering China in order to acquire low-price
advantage as our previous section has discussed.

Now let’s go back to the FG model, to maintain its comparative advantages among countries when the PC industry moved out, Taiwan has to achieve “heterogeneity” to differentiate itself from other countries. In other words, it should develop advanced techniques to distinguish itself from mainland China as well as to catch up with Japan.

At that time, government in Taiwan decided three industries to develop new technology—WIMAX industry, DRAM industry and LCD industry. However, while the government had invested significant funds, these three industries didn’t grow as the public expected. In the following, we will individually discuss these three industries, and the problems they face.

1. **WIMAX industry**

WIMAX is similar to WIFI, but can run faster and further. We can simply define it as a bigger WIFI. Previously, the future of the WIMAX industry was promising. Intel promised to funds the industry 5 billion dollar, while our government also supports them with a significant amount of investments. However, when most of the equipment had well-prepared, global trend prefer another wireless technique—LTE(4G). Lower cost and faster transmission make WIMAX hardly compete with LTE, the technique has later become the leading market technique. In the end, Intel no longer realized its
commitment.

Recently, government in Taiwan has planned to integrate 6 WIMAX companies, aiming to reach economic scale. Before achieving economic scale, several information technology services are unlikely to develop. However, even though they have successfully integrated, without the support from the telecommunication companies, they are unable to reach customers, or promote themselves to other countries. The fall of WIMAX industry is resulted from short-sighted policy.

2. **DRAM industry**

DRAM industry is one of the crucial industries that our country has supported. Both government and the public have made large investment on it until 2012, 5 DRAM companies in Taiwan has received funds more than nine thousands billion, still, the result is a disaster. In 2011, these companies had lost more than thousands billion. Not only is the industry in a deficit, but its market share has decreased significantly.

One of the main problems the DRAM industry encounters is that DRAM companies over-emphasize production scale rather than develop technology progress. Most of the companies purchase techniques and patent from foreign companies in order to cost down research expense. As mentioned before in “the existing industry”, expenses of loyalty and patent rise continuously, while the revenues the companies
earn are stagnant. Moreover, Relying on techniques from other companies is not only costly but also risky—the survival of those companies will largely influence the company who receives the techniques. If companies acquiring core techniques close down, the receivable companies have to find another company to buy techniques.

Another problem is that while our government had spent abundant of funds to support DRAM industry, the money was used to encourage the industry to mass production. In a series of rewarding treatment, the government gave special discount for the companies to purchase foreign machines and expand factories, making those companies extend their business scales while ignoring the importance of developing core technology. Nowadays, the industry is still highly influenced by foreign companies which acquire techniques.

Finally, DRAM industry in Taiwan is lack of the ability to manufacture flexibly. In the 2008 financial crisis, the industry had been stroked seriously. Still, some foreign companies overcome safely. The reason is that the industry in Taiwan mostly mass produce standardized DRAM, while foreign industries produce diversified products, which allows them to accommodate with the market demand as well as adjust the product structure to focus on high profit product. While Taiwan can only produce a single kind of DRAM, as the products are influenced by the market, the whole industry will fluctuate as well.
3. LCD industry

Taiwan’s LCD industry had once developed rapidly, mainly because of the successful transfer of high-yield-rate production techniques and the stability of supply and demand. However, while LCD industry in Taiwan had reached high position over the world, its output and value are unbalanced. According to PIDA, in 2004 LCD production in Taiwan is approximately the same with Korea, yet there are large gap between their profit.

Compared with the rival company—Samsung in Korea, LCD industry in Taiwan is lack of integration. In Korea, LCD industry successfully achieves vertical integration, acquiring capacity from manufacturing to marketing. Moreover, their government provides abundant of resources to develop LCD-related industry and equipment. On the other hand, LCD in Taiwan still halt in manufacture stage, making the industry merely concentrates on increasing production and unaware of market demand.

However, LCD is a highly market-oriented product with low compatibility. In the market, customers determine the prevailing size of the LCD. The dominant size sells good, and vice versa. As a result, the judgment of the size of LCD decides the profit companies will earn and also the investment they will receive. While LCD companies in Taiwan are not familiar with the market, they cannot forecast the prevailing size,
thus receiving low profit even though with high production.

Another problem is in the industry structure of LCD manufacture. LCD industry in Taiwan is located in the midstream of the production line. LCD has to be fabricated with other components to become a product. In the upstream of the industry are the “critical components”, most of which have to be imported from Japan. This factor makes Taiwan industry hardly surpass Japan in both technology development and industry scale.

Lastly, lack of core techniques forces these companies to purchase patents and techniques from foreign companies, which are mostly low-end techniques and also expensive. When the price of the techniques gets beyond the company’s budget, it may not buy it. Even though the company buys the techniques, it takes time for the company to recover.

In conclusion, back to the FG model, Taiwan is unable to catch up with the leading country in terms of technology. Its existing industries move out, while new industries are in stagnation, resulting in an industry hollowing-out situation, which leads to the condition we now face—the stagnation of low average wage.

IV. Conclusion

For conclusion, let us recall our topic—how to enhance the average wage? Does raising the minimum wage works? No, we are afraid that this is not a long-term
solution. Also, labor productivity is not the main problem, either.

As our report, the real problem in Taiwan is in the macro economy. Companies focus on short-term profit rather than long-term investment and technology controlling. Without core technology, we lost our comparative advantage and fall into industry stagnation. Therefore, we believe that the key solution is industrial transformation. We have to focus on long-term profit, developing high knowledge-intensive industries which can create extra brand value and equity to build indispensability in industry and raise gross profit margin. Until the time that we can earn more profit and hire highly qualified labor, we can have the ability to raise our wage level.

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