

Worldwide producers seek for optimal prices to gain higher market share. Since the cost sets floor for price, the interrelationship between cost and price are important for production planning (Dicks-Mireaux, 1961). There are existing pricing strategies, where the price set up according to amount of money spent to produce a good.

For many households the bread remains a base good. The vast majority of bread is traditionally produced from wheat (Goesaert, Brijs, Veraverbeke, Courtin, Gebruers & Delcour, 2005). Therefore, wheat becomes a necessity mean to satisfy the U.S citizens, which involves governmental regulations on price of the crop. Thus it is worthwhile to question whether or not the cost has a significant influence on the price. Here comes the second hypothesis, which is formulated as follows:

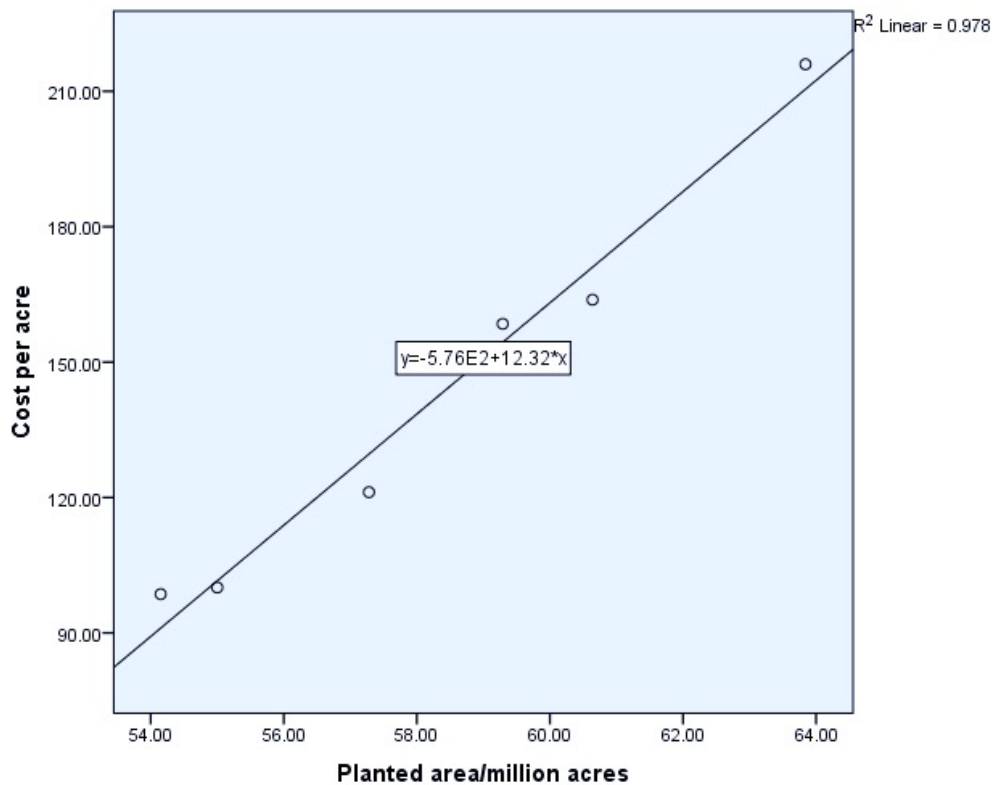
***Hypothesis 2: Decline in the total average cost of wheat accompanied by its price reduction in the United States.***

The same hypothesis which has been tested in China concluded that the average cost reduction positively correlated with the price decrease, thus leading to the fact that economies of scale exist in wheat industry (Jin, Rozelle, Alston, & Huang, 2005). Nevertheless, considering the fact that wheat cultivation is the part of China's historical and cultural inheritance, the main conclusions may not be the case for the United States.

Overall, the research question along with two supporting hypotheses will be discussed and tested in the following sections.

## **Data**

A number of statistical tools and applications are applied to support the research question along with its two hypothesis and draw a conclusion using Excel and software package SPSS. To investigate the existence of economies of scale in the wheat industry in the U.S over 2011-2016, three main variables are needed: farm sizes in million acres (official size measurement scale in the U.S), and both costs and prices in U.S. dollars per acre. In order to test the stated hypotheses, data from the published USDA National Agricultural Statistics Service official website, which has been recorded since 1866 were obtained. This database is updated monthly and gives reliable information about these three variables. For simplicity, prices and costs per acre are rounded to two decimals to show more precise numbers. In addition, some transformations were



The above presented scatterplot shows the coefficient of determination which is very insignificant, mainly 0.978. This means that 97.8% of the variability around the cost mean can be interpreted by the planted area. Furthermore, the equation  $y = -5.76E2 + 12.32 \cdot x$ , where E stands for exponentiation in base 10, shows that the coefficient for planted area in acres is 12.32 dollars (The modified equation would look as follows:  $y = -5.76 \cdot 10^2 + 12.32 \cdot x$ ). This coefficient indicates that for every additional acre in the planted area, the cost is expected to increase by an average of 12.32 dollars. Considering these outcomes, it is concluded that the first hypothesis has to be rejected implying that a rise in the plantation area does not necessarily reduce the cost of producing wheat. One logical explanation for this result is an increase of the fixed overhead cost due to the new machineries and equipment, improved irrigation system, developed seeding and harvesting methods along with the climate change. Another factor which affects the positive correlation between the planted area and the cost is a growing risk of workers' injuries, that can also increase the cost of the wheat production (Leigh, McCurdy, & Schenker, 2001). (All detailed tables with relevant coefficients are posted in Appendix 1.2)

## Hypothesis 2

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