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To Investigate Factors Affecting Price Volatilities of Onions

(Case Study: Jiroft City)

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Abstract: The aim of this study is to investigate the factors affecting the price volatility of onions in the city of Jiroft. The research method is descriptive - survey. Statistical community of farmers of cultivation of the onion in the city of Jiroft who are over 15 and the sample is obtained using a sample of 110 questionnaires that were randomly distributed is a questionnaire measurement tool which the validity is examined based on expert opinion and the confirmation of a supervisor and the reliability through Cronbach's alpha. To test the hypotheses of the Kolmogorov-Smirnov test and regression software have been used spss22. Based on the results obtained, inflation, changes in exchange rates, changes in interest rates, credit, liquidity, weather, supply, prices, presence or absence of guaranteed purchase and export or non- export of onions in the city of Jiroft have a significant impact on price fluctuations.

Keywords: Fluctuations in Onion Prices, Factors Affecting Onion Prices, Inflation, Changes in Exchange Rates.

Introduction

Based on available evidence, prices of agricultural products in comparison with other commodities have many fluctuations and sometimes more than before. There are various reasons for this, including as a result of the imbalance between supply and demand obtained and naturally, the intensity of the rate of change is dependent on factors affecting supply and demand. Also, agricultural products have an undeniable role in providing health and household food security on the one hand and creating jobs and contributing to the prosperity of non-oil exports are on the other hand, and they are considered by policymakers in all countries, both developed and developing ones. One of the most important functions of government is to provide at least the basic necessities of the people at reasonable prices according to the income level of the public. So, the government has an important role in product pricing and resulting fluctuations. Therefore, understanding the factors that lead to changes in the price of agricultural products has been very important and definitely will help to improve policy-making in the agricultural sector. On the other hand, due to high consumption of onions and vegetables in general among Iranian families and the group is very important in the food basket, given the price and the market for these products is more than ever before. Fluctuations in prices of onion which its consumption is high, it can have a negative impact on the nutrition of the population (Esmaeili Eazi, 2009).

On the other hand, Due to high consumption of onions and generally the group of vegetables among the Iranian households and high importance that this group has in the food basket, given the price and the market for these products is more than ever before. Fluctuations in prices of onion which is very high, it can have a negative impact on the nutrition of the population. Due to the difficulties which there are in producing and exporting agricultural products such as fluctuations in supply and price etc., the government can improve its policies an important role in the production and export and the evaluation of government policies in these products is necessary (Nasrollahi Boroujeni, 2002).

Fluctuations in prices of agricultural products could have negative effects on both the producer and consumer groups. Fluctuations in the price of some of the techniques of production planning make difficult and even impossible. If a farmer cannot estimate selling the price of his crops at harvest time, he cannot use his available resources properly and to maximize profits. Fluctuations in prices for agricultural products are one of the factors preventing the development and spread of technology as well. On the other hand, due to high consumption of onions and vegetables in general among Iranian families and the group is very important in the food basket, given the price and the market for these products is more than ever before. Fluctuations of the onion price which its consumption is can negatively affect the nutrition of the population. Also, the supply of agricultural products is not uniform over the years, in other words, the supply of agricultural products includes seasonal changes, for the preservation of agricultural products is done only at certain times during the year. In addition, in the case of perishable products such as warehousing facilities, it is not cold enough to be smooth flow during the year. As a result, farmers at harvest time must supply all or the bulk of their harvest to market at once which this leads to an interruption in the supply-demand balance. Meanwhile, the city of Jiroft where it is as one of the poles of onion producing countries plays a fundamental role in the supply of this product and given to price fluctuations can produce appropriate solutions in order to develop and improve the livelihoods of producers, put at the disposal of policy makers.

Materials and Methods

The research method is descriptive-survey in nature and content and is functional in objective. The population of this study, the agricultural sector of Jiroft city and specifically, onion cultivation sector in the city is about 150 people. According to Cochran's formula, the number of statistic sample is calculated as follows.

$$n = \frac{\frac{z^2 pg}{d^2}}{1 + \frac{1}{150}\left(\frac{z^2 pg}{d^2} - 1\right)} = 110$$

Cochran's formula is obtained approximately 110 for determining the sample size which the number of questionnaires is distributed randomly.

Research hypotheses

1. There is a significant relationship between the exchange rate and fluctuations in the price of onions in the city of Jiroft.
2. There is a significant relationship between the interest rate and fluctuations in the price of onions in the city of Jiroft.
3. There is a significant relationship between the liquidity and fluctuations in the price of onions in the city of Jiroft.
4. There is a significant relationship between the inflation rate and fluctuations in the price of onions in the city of Jiroft.
5. There is a significant relationship between the weather situations and fluctuations in the price of onions in the city of Jiroft.
6. There is a significant relationship between the supply and fluctuations in the price of onions in the city of Jiroft.
7. There is a significant relationship between the world price and fluctuations in the price of onions in the city of Jiroft.
8. There is a significant relationship between the absence of guaranteed purchase and fluctuations in the price of onions in the city of Jiroft.

9. There is a significant relationship between the absence of imports and fluctuations in the price of onions in the city of Jiroft.

Results

The study of descriptive statistics

Table 1 shows the descriptive statistics of the variables.

Table 1. Descriptive statistics of variables.

	Exchange rate	Interest rate	Liquidity	Inflation	Weather Conditions	Exchange rate	Guaranteed purchase	global price	The export
Number	110	110	110	110	110	110	110	110	110
No answering	0	0	0	0	0	0	0	0	0
Mean	2.8212	2.7227	3.0841	3.0341	3.3364	3.4409	2.8864	2.8318	3.1576
Standard deviation	0.73735	0.69347	0.70571	0.65093	0.83440	0.67553	0.98767	0.60304	0.641227
Variance	0.544	0.481	0.498	0.424	0.696	0.456	0.456	0.364	0.411
Minimum	1.00	1.00	1.25	1.75	1.33	2.00	1.00	1.50	2.00
Maximum	4.00	4.00	4.25	4.5	5.00	4.75	4.50	4.00	4.33
Domain	3.00	2.50	3.00	2.75	3.67	2.75	3.50	2.50	2.33

The first hypothesis

Table 2. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Exchange rate	Fluctuations in the price of onions	0.670	110	0.000	significant relationship

According to Table 2, Pearson correlation coefficient between the exchange rate and fluctuations in the price of onions is 0.670 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 3. Multiple regression analysis statistics and summary of regression model fitted.

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.670	0.449	0.444	0.38084	1.755

As Table 3 shows the correlation between the variables exchange rates and fluctuations in the price of onions is equal to 0.670. The coefficient of determination is achieved 0.449. This value indicates that 44% of exchange rate changes linked to fluctuations in the price of onions.

Table 4. Multivariate regression analysis of variance.

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	12.745	1	12.745	87.874	0.000
Residual	15.664	108	0.145		
Total	28.409	109			

According to Table 4, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 5. Multivariate statistical methods applied in the regression model.

	Partial correlation coefficients		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	11.929		0.144	1.720	0.000
exchange rate	9.374	0.670	0.049	0.464	exchange rate

The regression equation can be calculated by using the column of non-standardized as follows:

Price fluctuations = 1.720 + exchange rate (0.464)

The second hypothesis

Table 6. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Interest rate	Fluctuations in the price of onions	0.743	110	0.000	significant relationship

According to Table 6, Pearson correlation coefficient between the interest rate and fluctuations in the price of onions is 0.743 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 7. Multiple regression analysis statistics and summary of regression model fitted.

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.743	0.552	0.548	0.34320	2.130

As Table 7 shows the correlation between the variables of the interest rate and fluctuations in the price of onions is equal to 0.743. The coefficient of determination is achieved 0.552. This value indicates that 55% of the price of onions changes is linked to increasing the interest rate.

Table 8. Multivariate regression analysis of variance.

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	15.688	1	15.688	133.196	0.000
Residual	12.721	108	0.145		
Total	28.409	109			

According to Table 8, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 9. Multivariate statistical methods applied in the regression model.

	Partial correlation coefficient		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	11.559		0.133	1.539	0.000
Interest rate	11.541	0.743	0.047	0.547	0.000

The regression equation can be calculated by using the column of non-standardized as follows:

Price fluctuations = 1.539 + interest rate (0.547)

The third hypothesis

Table 10. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Liquidity	Fluctuations in the price of onions	0.768	110	0.000	significant relationship

According to Table 10, Pearson correlation coefficient between the liquidity and fluctuations in the price of onions is 0.768 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 11. Multiple regression analysis statistics and summary of regression model fitted.

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.768	0.589	0.585	0.32872	2.087

As Table 11 shows the correlation between the variables of the liquidity and fluctuations in the price of onions is equal to 0.768. The coefficient of determination is achieved 0.589. This value indicates that 58% of the price of onions changes is linked to the liquidity.

Table 12. Multivariate regression analysis of variance.

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	16.739	1	16.739	15.905	0.000
Residual	11.670	108	0.108		
Total	28.409	109			

According to Table 12, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 13. Multivariate statistical methods applied in the regression model.

	Partial correlation coefficient		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	9.326		0.141	1.316	0.000
Liquidity	12.446	0.768	0.045	0.555	0.000

The regression equation can be calculated by using the column of non-standardized as follows:

Price fluctuations = 1.316 + Liquidity (0.555)

The forth hypothesis

Table 14. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Inflation rate	Fluctuations in the price of onions	0.777	110	0.000	significant relationship

According to Table 14, Pearson correlation coefficient between the inflation rate and fluctuations in the price of onions is 0.777 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 15. Multiple regression analysis statistics and summary of regression model fitted.

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.777	0.604	0.600	0.32277	2.285

As Table 15 shows the correlation between the variables of the inflation rate and fluctuations in the price of onions is equal to 0.777. The coefficient of determination is achieved 0.604. This value indicates that 60% of the price of onions changes is linked to increasing the inflation rate.

Table 16. Multivariate regression analysis of variance.

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	17.158	1	17.158	16.695	0.000
Residual	11.251	108	0.104		
Total	28.409	109			

According to Table 16, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 17. Multivariate statistical methods applied in the regression model.

	Partial correlation coefficient		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	8.004		0.147	1.179	0.000
Inflation rate	12.833	0.777	0.047	0.610	0.000

The regression equation can be calculated by using the column of non-standardized as follows:

Price fluctuations = 1.179 + Inflation rate (0.610)

The fifth hypothesis

Table 18. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Weather conditions	Fluctuations in the price of onions	0.715	110	0.000	significant relationship

According to Table 18, Pearson correlation coefficient between the weather conditions and fluctuations in the price of onions is 0.715 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 19. Multiple regression analysis statistics and summary of regression model fitted.

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.715	0.511	0.507	0.35853	1.909

As Table 19 shows the correlation between the variables of the weather conditions and fluctuations in the price of onions is equal to 0.715. The coefficient of determination is achieved 0.511. This value indicates that 51% of the price of onions changes is linked to the weather conditions.

Table 20. Multivariate regression analysis of variance.

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	14.527	1	14.527	113.013	0.000
Residual	13.882	108	0.129		
Total	28.409	109			

According to Table 20, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 21. Multivariate statistical methods applied in the regression model.

	Partial correlation coefficient		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	11.088		0.142	1.569	0.000
Weather conditions	10.631	0.715	0.041	0.438	0.000

The regression equation can be calculated by using the column of non-standardized as follows:

Price fluctuations = 1.569 + Weather conditions (0.438)

The sixth hypothesis

Table 22. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Supply	Fluctuations in the price of onions	0.740	110	0.000	significant relationship

According to Table 22, Pearson correlation coefficient between the supply and fluctuations in the price of onions is 0.740 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 23. Multiple regression analysis statistics and summary of regression model fitted.

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.740	0.543	0.547	0.34512	1.994

As Table 23 shows the correlation between the variables of the supply and fluctuations in the price of onions is equal to 0.740. The coefficient of determination is achieved 0.543. This value indicates that 54% of the price of onions changes is linked to the supply.

Table 24. Multivariate regression analysis of variance.

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	15.546	1	15.546	130.517	0.000
Residual	12.864	108	0.119		
Total	28.409	109			

According to Table 24, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 25. Multivariate statistical methods applied in the regression model.

	Partial correlation coefficient		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	6.441		0.172	1.105	0.000
Supply	11.424	0.740	0.049	0.550	0.000

The regression equation can be calculated by using the column of non-standardized as follows:

Price fluctuations = 1.105 + Supply (0.559)

The seventh hypothesis

Table 26. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Presence or absence of guaranteed purchase	Fluctuations in the price of onions	0.679	110	0.000	significant relationship

According to Table 26, Pearson correlation coefficient between the presence or absence of guaranteed purchase and fluctuations in the price of onions is 0.679 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 27. Multiple regression analysis statistics and summary of regression model fitted.

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.679	0.461	0.456	0.37664	2.441

As Table 27 shows the correlation between the variables of the presence or absence of guaranteed purchase and fluctuations in the price of onions is equal to 0.679. The coefficient of determination is achieved 0.461. This value indicates that 46% of the price of onions changes is linked to the guaranteed purchase.

Table 28. Multivariate regression analysis of variance.

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	13.088	1	13.088	92.261	0.000
Residual	15.321	108	0.142		
Total	28.409	109			

According to Table 28, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 29. Multivariate statistical methods applied in the regression model.

	Partial correlation coefficient		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	18.101		0.111	2.016	0.000
Guaranteed purchase	9.605	0.679	0.037	0.351	0.000

The regression equation can be calculated by using the column of non-standardized as follows:

Price fluctuations = 2.216 + Guaranteed purchase (0.351)

The eighth hypothesis

Table 30. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Global price	Fluctuations in the price of onions	0.758	110	0.000	significant relationship

According to Table 30, Pearson correlation coefficient between the global price and fluctuations in the price of onions is 0.758 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 31. Multiple regression analysis statistics and summary of regression model fitted

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.758	0.575	0.571	0.33535	2.448

As Table 31 shows the correlation between the variables of the global price and fluctuations in the price of onions is equal to 0.758. The coefficient of determination is achieved 0.575. This value indicates that 57% of the price of onions changes is linked to the global price.

Table 32. Multivariate regression analysis of variance

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	16.336	1	16.336	146.131	0.000
Residual	12.073	108	0.112		
Total	28.409	109			

According to Table 32, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 33. Multivariate statistical methods applied in the regression model.

	Partial correlation coefficient		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	7.876		0.154	1.211	0.000
Global price	12.088	0.758	0.053	0.642	0.000

The regression equation can be calculated by using the column of non-standardized as follows:

The ninth hypothesis

Table 34. Pearson correlation results.

The first variable	The second variable	The correlation coefficient	Number	Significance level	test results
Export or non- export	Fluctuations in the price of onions	0.423	110	0.000	significant relationship

According to Table 34, Pearson correlation coefficient between the global price and fluctuations in the price of onions is 0.423 and the statistical significance test is (0.000). Given the significant level of correlation is less than 0.05; therefore, the null hypothesis is rejected and with certainty 0.99 it can be said that there is a significant relationship between these two variables.

The results obtained from regression

Table 35. Multiple regression analysis statistics and summary of regression model fitted

Multiple correlation coefficient	The coefficient of determination	Adjusted coefficient of determination	The standard error of estimation	Durbin Watson
0.423	0.179	0.172	0.46464	2.429

As Table 35 shows the correlation between the variables of the import and fluctuations in the price of onions is equal to 0.423. The coefficient of determination is achieved 0.179. This value indicates that 17% of the price of onions changes is linked to the export or non-export.

Table 36. Multivariate regression analysis of variance

	sum of squares	Degrees of freedom	average of squares	F	Sig
Regression	5.093	1	5.093	23.591	0.000
Residual	233.316	108	0.216		
Total	28.409	109			

According to Table 36, the significant level obtained for the statistics is calculated 0.000 and show a significant regression in the level 0.99.

Table 37. Multivariate statistical methods applied in the regression model

	Partial correlation coefficient		Non-standardized coefficients		The significance level
	T	Beta	Std. Error	B	Sig
Fixed value	8.786		0.224	1.964	0.000
Import rate	4.857	0.423	0.069	0.337	0.000

The regression equation can be calculated by using the column of non-standardized as follows:

Price fluctuations = 1.964 + (0.337) import

Changes in exchange rates are a factor for fluctuations in the price of onions. Given the significant level of correlation is less than 0.05, and with certainty 0.99, it can be said that there is a significant relationship between these two variables. The results of this study with the results of sheikh and Nazemianpour (2003) are consistent.

Given the significant level of correlation is less than 0.05, and with certainty 0.99, it can be said that there is a significant relationship between these two variables and given the correlative coefficient is positive, so it can be concluded there is a direct relationship between two variables. The results of this study with the results of Sahraeian and Bakhshoudeh (2009) are consistent.

The third hypothesis

Liquidity in exchange rates is a factor for fluctuations in the price of onions. According to the Table 10-4, Pearson correlation coefficient between the liquidity and volatility of the price of onions is 0.768 and the significant level of the test is 0.000. Given the significant level of correlation is less than 0.05, so with certainty 0.99, it can be said that there is a significant relationship between these two variables and given the correlative coefficient is positive, so it can be concluded there is a direct relationship between two variables. The results of this study with the results of Shaikhi and Nazemian (2003) are consistent.

The forth hypothesis

Inflation rate is a factor for fluctuations in the price of onions. Given the significant level of correlation is less than 0.05, so with certainty 0.99, it can be said that there is a significant relationship between these two variables and given the correlative coefficient is positive, so it can be concluded there is a direct relationship between two variables. The results of this study with the results of Rahimi and Kalantari (2010) are consistent.

The fifth hypothesis

Weather conditions are a factor for fluctuations in the price of onions. Given the significant level of correlation is less than 0.05, so with certainty 0.99, it can be said that there is a significant relationship between these two variables and given the correlative coefficient is positive, so it can be concluded there is a direct relationship between two variables. The results of this study with the results of Rezaee et al are not consistent.

The sixth hypothesis

Supplying is a factor for fluctuations in the price of onions. Given the significant level of correlation is less than 0.05, so with certainty 0.99, it can be said that there is a significant relationship between these two variables and given the correlative coefficient is positive, so it can be concluded there is a direct relationship between two variables. The results of this study with the results of Shaikhiand Nazemian (2003) are not consistent.

The seventh hypothesis

Presence or absence of guaranteed purchase is a factor for fluctuations in the price of onions. Given the significant level of correlation is less than 0.05, so with certainty 0.99, it can be said that there is a significant relationship between these two variables and given the correlative coefficient is positive, so it can be concluded there is a direct relationship between two variables. The results of this study with the results of Moqaddas et al (2011) are not consistent.

The eighth hypothesis

Global price is a factor for fluctuations in the price of onions. Given the significant level of correlation is less than 0.05, so with certainty 0.99, it can be said that there is a significant relationship between these two variables. The results of this study with the results of Moqaddas et al (2011) are consistent.

The ninth hypothesis

Exports or non-exports are a factor for fluctuations in the price of onions. According to the Table 34-4, Pearson correlation coefficient between the exports or non-exports and volatility of the price of onions is 0.423 and the significant level of the test is 0.000. Given the significant level of correlation is less than 0.05, so with certainty 0.99, it can be said that there is a significant relationship between these two variables. The results of this study with the results of Najafi et al are consistent.

Conflict of interest

The authors declare no conflict of interest

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