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IMPACT OF INFLATION UNCERTAINTY ON THE FINANCIAL STRUCTURE OF MUNICIPALITY AND URBAN MANAGEMENT (Case Study: Tehran Municipality)

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One of the most important problems which politicians and urban managers are always involved in is the limited resources to meet the needs of city and citizens. Hence, it can be seen that the strategy of financing the country's municipalities is mainly focused on more revenue, most of which are unstable and unjust and little by little has pushed their revenue structure towards inconstancy. Therefore, making a reform on how to finance municipalities has become an essential matter in urban managers' programs to find ways to fix it, while they try to identify the causes of instability. One of the factors affecting the stability of municipalities' revenue structure is the inflation uncertainty. Hence, in this paper, using descriptive and analytical methods and library study, the researchers first extracted the theoretical concepts and principles regarding inflation uncertainty. Then, to find the inflation rate, they used general autoregressive variance anisotropy method so that they could study the existence of this factor in the structure of municipal revenue (for example: Tehran Municipality) in a time interval of 2001–2013 and its effects on the stability of revenue system. In the following, in order to make clear the impacts of inflation uncertainty on the urban management, the researcher took advantage of constitutional view on a costs economic theoretical framework. Findings indicate that in the time interval of the above-stated years, inflation uncertainty has played an important role in the inconsistency of Tehran Municipality structure. Furthermore, this factor, along with increasing the transactional cost has caused the urban management body to finally face (by creating disorders in compiling and administering the programs, tendency to make short and mid- programs, the lack of interest in private firms in making cooperation with the municipality, increasing the risk of municipal economic activities) mistrust atmosphere among the citizens.

Keywords: *Inflation uncertainty, Transaction cost, Tehran Municipality, Urban Management, and Institutionalism.*

1. Introduction. Following the daily spread of urban areas and the increasing trend of urbanization, municipalities' duties as the most important planning and management institution regarding the city, have taken different and complicated aspects. The previous researches show that this institution is not enjoying enough financial power in advancing countries to obviate the increasing problems of the cities and does its own assigned duties, which are usually facing a phenomenon called financial gap. The fiscal gap displays a kind of difference and divergence between the service needs of urban population and the financial resources of the municipalities. However, in most advanced countries, municipalities pay to urban affairs while subset and relevant agencies make full cooperation with them and the mayors have an exalted rank in the society and hence, they have been given broad and open powers. In fact, urban management in such cities shows local governance theoretically which accordingly the municipalities control the full affairs of their related districts. This kind of management is very dependent on local revenues. However, the government ought to pay its own activity costs in the city and try to supply the financial costs, which are expected by the national governing institution. Under these conditions, municipal acting power to supply the financial requirements of the city and obviating citizens' needs will be high. But, in developing countries such as Iran, a lack of comprehensive approach to the revenue resources of the municipalities in the form of macroeconomic system of the country, sectional changes and interventions, administering the self-supporting policy and municipal self-sufficiency, severe dependency of municipal revenue part on urban constructions and selling the excess density, have put the revenue part of the municipalities in a condition of inconsistency. In addition to the above-mentioned cases, there is another important factor called "inflation Uncertainty" that has always affected the inconsistency of municipal financing system and been neglected. The experts have stated numerous and different viewpoints regarding the way in which this factor affects the urban economic structure. They believe that inflation imposes large costs to the society in average and especially severe rates. However, the most

important economic losses are resulted from a lack of inflation certainty rate regarding the future. Uncertainty about inflation rate in the future affects the decisions of economic factors and affects their consumption rate, investment, and savings. Furthermore, this uncertainty will have a negative impact on efficiency in optimized resources allocation [15].

Friedman stated that the uncertainty resulted from future inflation would lead to increasing the level of economic activities and in the following leads to an increase in unemployment rate [9]. Tommasi [32] and Grier and Perry [11] made several researches and their results showed the negative impacts of inflation uncertainty on production growth. It means that inflation uncertainty in high rates will lead to a lack of optimized resources allocation, which finally shows its negative effect on the production rate.

Hafer [14], Davis and Kanago [6] have showed the negative relationship between inflation uncertainty and real economic activities through field studies. Furthermore, Bruner and Hess [5], Lee and Ni [19] have found exactly this negative relationship through GARCH and ARCH models [8, p. 27–28].

In addition to the above-mentioned viewpoints, another group of the experts, which are called as constitutionalist economists have presented several ideas regarding the way inflation uncertainty, affects the economic structure. Overall, it could be stated that increasing transaction costs could be considered as the most important results of inflation uncertainty in a city economy. Constitutionalists believe that the transactional costs are in fact those unpredicted costs, which are imposed to the other party of the transaction for the lack of commitment of one of the parties to the transaction conditions. In other words, transaction costs are in fact those costs, which people are supposed to pay in an economic transactional process to guarantee, define and specify their rights. Therefore, the transaction costs include those costs regarding gaining information about the seller, buyer and the quality of transacted goods, the costs of the contract and observing the other party's operations and the most important of all regards the costs of defining property rights and guaranteeing applying these rights [29, p. 327].

For example, if we are purchasing from a fruit store, in this case the shopping price would not just include the fruit price, rather it will involve the effort costs, consumed energy to find the necessary information about the intended fruit, travelling costs from home to the store and returning back to home, the cost of time spent in the queue, are exactly the transaction costs which can sometimes have a great share in the final costs. When there are not enough and exact information about the market, transaction costs increase and when there is economic clearance, these costs tend to decrease. The institutionalisms, taking advantage of TCE frameworks (transaction cost economy), have tried to theorize the inflation uncertainty and its impacts on the economic structure of urban areas and the countrywide too.

With all these explanations, attempts have been made to study first the existence of inflation uncertainty as one of the inconsistency factors in the revenue structure of municipalities (For example: Tehran Municipality). Then the researchers will try to measure the way in which inflation uncertainty affects the system of financing municipalities from an institutionalism perspective and taking advantage of the transaction cost economy principles and frameworks and finally explain the impacts of this phenomenon on the body of urban planning and management.

2. The necessity of the research. Uncertainty is in fact a status in which those possible events, which may occur in the future, are not clear or if they are clear, the possibilities regarding these events are not accessible. Hence, when each or both of these situations happen to occur, it would be hard and complicated to make decisions about the future. Therefore, an uncertainty atmosphere dominates the decisions. Inflation uncertainty is a situation in which the decision makers and economic agents are uncertain about the future inflation rate, which they will face [8, p. 86].

Golob considered inflation uncertainty as one of the most important inflation costs, which interferes with consumers and investors' decisions regarding the future and leads to a decrease in their welfare rate; because without the existence of such uncertainty, they can decide better [13]. Okun believes that uncertainty in inflation leads to deviation in consumers and producers' decisions regarding the savings, consumption, and investment [23]. These deviations will have negative impacts on the efficiency of resources allocation and the real economic activity rate. The existence of inflation uncertainty will double the costs of economy agents, because a part of their resources will be spent on predicting the future inflation in the uncertainty situations in the market and in fact will affect the loss or the benefit of the manufacturing and service firms.

In addition to all these experts, some institutionalism followers such as Coase, nort, and Williamson, believe that the existence of uncertainty (like inflation uncertainty) can lead to an increase in transaction costs. A researcher called Ronal Koz in 1937 first posed the concept of transaction cost [30, p. 57].

Generally, it would be safe to state that the economy of transaction cost is an interdisciplinary approach and its main concepts are rooted in the complementary and dependant researches of the 1930s in economics, law, and organization, which these researches were done on the criticism of the Orthodox [21, p. 159]. The economy of transaction costs begins with criticizing the perfect rationality assumption (instrumental rationality) and tries to reform and expand the neoclassic analysis framework while trying to modify the instrumental rationality. The goal of this criticism and modification is to promote the theory capabilities in facing the real world matters. That is because the theoreticians believe that we should not treat the economy as a box of tools and assume that using that, it is possible to analyze each subject [21, p. 163]. In the neoclassic analysis framework, the meaning of rationality by economic agents is that they (the agents) make their choices in a way in which they get to their expectations compared to their revenues. Assuming that at first people should be able to predict what will happen in the future and at the second, each person should benefit from a kind of computational power so that he would be able while well predicting the events, evaluate the possibility of the occurrence of each event and third, the values should be defined and clear and compatible and each person makes the same choices in the similar situations. It means that there should be a fixed set of evaluation criteria [22, p. 49–50]. In other words, uncertainty about the events, which will happen in the future, and a lack of exact evaluation of the possibility of the occurrence of future events and the different evaluation criteria for people and the institutions, makes a distrust atmosphere, which leads to the increase of transaction costs. Here are some of the transaction costs:

– The costs of gaining information and searching: such costs include the search for determining the location for offering the goods and services at the market and gaining information about the lowest prices at the market. The more we have information, the lesser would be our transaction costs.

– Contract costs: include the necessary costs for making an agreement with all the other parties and making a contract.

– Legislation costs and law enforcement: include those costs which are assigned for assuring from the compliance of the other party with the contract provisions and reacting if necessary [30, p. 57–58].

However, according to the definition of inflation uncertainty and its consequences, which were described, it could be concluded that this factor plays an important role in increasing the transaction costs in the city. By the way, it should be mentioned that this concept is used to discuss on the individuals and institutions' different behaviors.

The inflation uncertainty phenomenon puts its first negative impacts on municipality institution to weaken and make the revenue structure of municipality unstable and after that distorts the system of urban management and planning by increasing the transaction costs of this institution. That is why the study of the existence of this phenomenon in the structure of municipalities' revenues and its impacts on the field of urban management should be in the priority of urban studies.

3. Methodology and model introduction. As it was stated earlier, inflation uncertainty factor is an important and affective agent on the revenue structure of the municipalities. Regarding the concept of this factor and the way it affects the revenues of municipalities, first the researchers, using library study, identified the different perspectives, approaches, computational methods, and the theoretical basis of inflation uncertainty. In order to study the existence of inflation uncertainty in the revenue structure of municipalities, (for instance: Tehran Municipality in a time interval of 2001 to 2013) different evaluative and computational methods and variable measurements were considered. Some of the methods are briefly discussed below:

– The simplest way to calculate the inflation uncertainty is using variance or standard deviation of the monthly inflation rate, which is used for the calculation of inflation uncertainty during the year.

– The future possible inflation rate method is used by the predictors. In this method, the predictor is asked to state the possibility of the future inflation rate.

– The use of econometric techniques and methods. In this method, after the estimation of the suitable model to explain the inflation's behavior, inflation rates in the studied period are predicted and then the standard deviation of the predicted error in the estimating model of inflation uncertainty will be found. Although, there is no total agreement on the best model for predicting the agreed inflation, the general models of ARCH and its generalized form called GARCH, GARCH-M, are preferable. Such models make it possible for us to estimate the inflation uncertainty using the conditional error variance, which may change over time [7, p. 55–56].

In this research, however, in order to study the impacts of inflation uncertainty of the financing structure of Tehran municipality the researchers used the below basic model and seasonal data of years 2001

Table 1

The operation of revenue seasons of Tehran municipality during 2001–2013. Unit: 1000 rials

2007	2006	2005	2004	2003	2002	2001	Description
9,329,100,269	6,820,236,450	4,480,391,613	3,906,647,989	3,563,746,251	2,140,324,922	1,863,374,867	First season
19,181,735,796	11,671,604,072	7,179,149,636	7,077,325,218	5,942,074,075	3,527,176,821	3,124,067,453	Second season
2,691,022,755	1,016,248,610	1,571,432,047	301,828,765	960,976,767	431,379,150	0	Third season
31,201,858,821	19,508,089,132	13,230,973,295	11,285,801,972	10,466,797,093	6,098,880,893	4,987,442,320	Total
	2013	2012	2011	2010	2009	2008	Description
	56,465,034,835	37,073,020,383	22,573,823,788	22,341,129,129	15,995,812,457	14,055,094,485	First season
	82,357,248,603	76,699,107,402	52,894,198,431	50,260,821,791	39,192,504,091	32,369,695,362	Second season
	17,467,906,950	14,299,000,000	8,775,494,122	9,939,845,084	6,127,931,436	6,356,711,606	Third season
	156,290,190,388	128,071,127,785	84,243,516,341	82,541,796,004	61,316,247,983	52,781,501,453	Total

Source: Budget and programming center of Tehran municipality.

to 2013. In fact, there are three models estimated as follow which in each of them the seasonal revenue of Tehran municipality has been used as a dependent variable. In other words, this model is going to measure the impact of inflation uncertainty on the threesome seasons of Tehran municipality.

$$I_{it} = \beta_0 + \beta_1 INV_t + \beta_2 RS_t + \varepsilon_t,$$

Where, *I*: Municipality's revenues logarithm (I is a symbol of each seasons of municipality revenues)

INV: The inflation uncertainty rate

RS: The total added value of building services section in Tehran

And ε is a symbol of disturbing

It should be noted that data used for these variables have been extracted from the budget and planning center of Tehran municipality and the economic databases of economic data bank of Iran's central bank (Table 1). The other notable point is that, the researchers have used EGARCH method to get to the inflation uncertainty rate; because this model is more powerful and comprehensive compared to the other uncertainty models.

3.1. Variance Heterogeneity Pattern (GARCH, ARCH). In order to obtain a suitable measurement, using econometric methods, we should first choose the best model time series using Schwartz-Bayesian criterion and correlation chart and after that study the existence or non-existence of ARCH using ARCH-LM.

In the following, the results of table 3 shows that the null hypothesis of this test based on ARCH disaffect, is rejected at 95 % confidence level and its opposite

Table 2

The test results

F ARCH-LM	$21138^{5}.2$
Chi^2 ARCH-LM	$21992^{1.3}$ (0.042)

hypothesis (the existence of the impact of ARCH) is accepted. Finally, we start to estimate the EARCH (1, 1) model using Variance Heterogeneity conditional models. EARCH (1, 1) model is based on the following table.

Table 3

The results of estimation EARCH (1, 1)

Possibility	t ARCH-LM	Standard deviation	Factor	EARCH
0.0120	–2.511357	1.731592	–4.348646	C (2)
0.0191	2.343749	0.778142	1.823771	C (3)
0.0434	0.766465	0.590872	1.452883	C (4)
0.0266	2.216842	0.241553	0.535485	C (5)

3.2. The autoregressive with distribution lags (ARDL). In ARDL method, using some criteria such as Schwartz-Bayesian, Akaike Criter and Hanan Queen, optimized lags are selected. This method, estimates the long and short-run relationships between the dependent variable and other pattern's expressive variables simultaneously. In using this approach, it is not necessary to have the variables collective degree, which is essential in Angel-Granger method. ARDL

methodology is applicable too when the variables are a combination of variables (1) and (2). Generally, a dynamic pattern is a pattern in which variables lags enter just like (1) relationship.

$$\phi(L,P)Y_t = \sum_{i=1}^{k} b_i(L,q_i)X_t + c'w_t + u_t \quad (1)$$

To decrease the bias related to model's coefficients in smaller versions, it is better to (as much as possible) use a model, which considers many lags for the variables just like (1) relationship.

$$\phi(L,P)Y_t = \sum_{i=1}^{k} b_i(L,q_i)X_t + c'w_t + u_t$$

In the above relationships, and are the dependent and independent variables. The L and wt show the lag actor and S×1 vector receptively, which represent the preselected variables in the discussed model from the origin of the virtual variables, time trend, and all other exogenous variables. P represents the number of lags used for dependent variable and q shows the used lags for dependent variables.

The above model is a self-expressive model with distribution lags (ARDL) which is as follows:

$$\phi(L,P) = 1 - \phi_1 L - \phi_2 L^2 - .... - \phi_p L^p \quad (2)$$

$$b_i(L,q_i) = b_{i0} + b_{i1}L + ... + b_{iq}L^q \quad i = 1, 2,..., k \quad (3)$$

The number of optimized lags for each of expressive variables could be determined using one of the principles of Akaike Criter (AIC), Schwarz-Bayesian Criter (SBC), Hannan-Quinn Criter (HQC) or the modified determination coefficient. Usually, in the cases lower than 100, Schwartz-Bayesian criterion are used so that the researchers would not lose much degree of freedom. This criterion makes saving in lags determination and consequently the estimation will have more degree of freedom [31]. To calculate the long-term coefficients of the model, the dynamic model can be used. The long-term coefficients related to X variables are obtained from this relationship:

$$\theta_i = \frac{\hat{b}_i(L,q_i)}{1-\hat{\phi}(L,p)} = \frac{\hat{b}_{i0} + \hat{b}_{i1} + ... + \hat{b}_{iq}}{1-\hat{\phi}_1 - \hat{\phi}_2 - ... - \hat{\phi}_p}, i = 1,2,.. \quad (4)$$

Using (4) relationship, the amount of (t) related to the calculated long-term coefficient is computable too. Inder showed that t statistics of this type has normal distribution and t test is of good capabilities based on the normal crisis quantities [17]. Therefore, using, it is possible to hold valid tests in relation to the existence of a long-term relationship. In ARDL model, it is possible to use two-step procedure to estimate the long-term relationship which as follows. In the first step, the existence of a long-term relationship between the studied variables is tested [31]. In this step, there is two ways to study whether the long-term relationship (which has been produced by this model) is not false, which the researchers of this paper will use the first model that is as follows. In this model, after estimating the ARDL dynamic model, the below hypothesis is tested

$$H_0 : \sum_{i=1}^{p} \phi_i - 1 \geq 0$$

$$H_a : \sum_{i=1}^{p} \phi_i - 1 \prec 0$$

A null hypothesis represents the lack of collective existence or long-term relationship. To do the intended test which has been presented by Banerjee, et al. [3] we ought to subtract 1 from the sum of the coefficients added with variable lag and divide it into the sum of coefficients standard deviation in which the test's statistics will be of t statistics kind.

$$t = \frac{\sum_{i=1}^{p} \hat{\phi}_i - 1}{\sum_{i=1}^{p} S_{\hat{\phi}_i}}$$

In the obtained absolute value of t is bigger than the absolute value of crisis values by Banerjee, Dolado, and Master, in the confidence level of 95 %, the null hypothesis of the lack of collective existence will be rejected and the existence of long-term relationship will be accepted.

4. Theoretical Principles. Studies carried out on this subject show that there are two important perspectives on the relationship between inflation and inflation uncertainty. In the first perspective, which is known as Friedman-ball1, the inflation is in fact the reason to inflation uncertainty and their relationship is positive. It means that by increasing the inflation rate, the inflation uncertainty increases or by decreasing the inflation rate, the inflation uncertainty decreases. Friedman first used the positive relationship between these two variables in 1977 to justify the Philips positive curve slope and after that, it was formulated and analyzed by Ball [2, p. 371] by using asymmetric information which exists among the public and politicians. Ball believes that when the inflation rate is low in the society, the politicians try to keep it at that rate. However, when

the inflation rate is high, the public know that some of the politicians tend to tolerate the high inflation rate, while some other politicians try to impose the costs of inflation decreasing such as the increase of unemployment by decreasing the inflation rate. Therefore, where economy is facing high inflation, there will be a lack of trust in the monetary policy models because of the future inflation costs exchanges and anti-inflation policies costs. Therefore, the economy will face uncertainty about the future inflation.

The second perspective is attributed to Cukierman-Meltzer. They believe that inflation uncertainty is the reason to inflation, not its effect. It means that by increasing the inflation rate, the inflation uncertainty increases or by decreasing the inflation rate, the inflation uncertainty decreases. The opinion of this group is based on Barro-Gordon [4, p. 101], quoted from Emami & Salmanpoor [7, p. 55] framework. According to this perspective, the creating sudden inflation, try to incite the real economic activities. In other words, when the inflation uncertainty is at a high rate, (because the politicians know that the level of economic activities will decrease) the politicians choose the expansion activities. Following the expansion activities, the general price levels increase too and the inflation uncertainty will be the reason of inflation in the society.

In addition to the above-mentioned ideas, the institutionalism follower economists, posing the subject of transaction costs economy, tried to explain and analyze the inflation uncertainty phenomena and measuring their impacts on the structure of countries' macro economy. Hence, in this paper, attempts have been made to take advantage of institutionalism followers in the field of urban areas economy.

The economy of transaction cost has questioned the perfect rationality (instrumental rationality) of the neoclassic economy and tried to modify it. That is why, on the institutionalism perspective, a theory is supposed to be capable of facing the real world issues. It is inferred from the hypothesis of perfect rationality that:

– It is not necessary to make a difference between the real world and the decision makers' understanding of it, because the individuals perceive the world as it is.

– Using the obtained data from the real world, it is possible to predict a rational decision maker choice without being aware of decision makers' perceptions or their computational methods [22, p. 49–50].

However, under such conditions, the economy of transaction costs starts its discussion by making two criticisms on the perfect rationality hypothesis and substitutes it with two other behavioral hypothesis. According to the above model, rational actors act first, but they face two limitations in blurting rational behaviors; A: the data are incomplete and, B: the information is not accessible for all the individuals, so they make their decisions according to a steady database. The second limitation is that even if the data is accessible for all the individuals, the computational power of the actors is not enough to be able to calculate the whole events and possibilities precisely and make the right decision accordingly. This targeted rationality but limited by the information and computational power of the actors is the first behavioral hypothesis, which substitutes the economy of transaction costs with the perfect rationality hypothesis. In confirming this behavioral hypothesis and expressing the way forward for the institutionalism followers, Nort narrates the below passage from Simon:

If we accept that both the information and the computational power of the decision makers are limited, then we should make a distinction between the real world and the economic actors' deductions. In other words, we should design a theory about the decision making process and test it experimentally. Our theory should not only include the deductive processes, but also it should involve the actors' mental visualization processes (regarding the decisions matter) and their conceptual framework dynamic processes. In a neoclassic economy, a rational individual usually makes some decisions, which are the best choice according to the given utility function. However, on a psychological perspective, a rational individual is a person who makes his decisions in a way that his approach is the most rational procedure regarding the existence data and computational tools [22, p. 49–50].

The acceptance of rationality hypothesis means that individuals cannot sign full contracts, which include all their intended events and probabilities while making transactions in the market. Therefore, as a principle in the economy of transaction costs, the contracts are always incomplete [21, p. 165]. On the other hand, since the contracts are always incomplete, it is potentially possible for the individuals seeking personal gains to use the existence flaws of the contract to their own benefit and others' loss. In other words, the limited rationality creates this basis so that the individuals are able to provide their own personal interests by deception. Opportunism does not mean that all people are sly and opportunists, rather, this underlying assumption means that there is a probability to misuse the flaws of a contract. Hence, Williamson states the duty of transaction costs economy as follows:

Decreasing the risks of opportunism (observing the past) is done through organizing the observer on the future of the activity axis of transaction costs economy (Williamson [34, p. 31], quoted from Nasiri Aghdam [21, p. 174]). In other words, in any moment of the time, for the sake of individuals' opportunism, there are some costs exposed to the organization, which may be due to the flaws related to past designing in the organization (while making contracts). Therefore, in designing every organization, attempts have been made to choose an approach for organizing the affairs, which can create the lowest costs rate for the organization (after making the contract). This idea is the working orientation of transaction costs economy. Hence, considering the clear risks of opportunism in the contracts, it is possible to lower them and decrease the transaction costs.

From the perspective of institutionalism, there is another issue, which is attended in the economy of transaction costs named as "uncertainty". Uncertainty is a state in which the probability of an event occurring is not determinable at all. It means that it is not possible to consider any probable distribution for the outputs [24, p. 431]. Among the experts of this domain, Koopman divides the uncertainty into two categories: the primary and secondary uncertainty. Primary uncertainty is related to the ambiguity of the situations and is usually resulted from the natural random behavior and unpredictable changes in consumers' preferences [34, p. 60]. In Cukierman's idea, the secondary uncertainty results mainly from a lack of communication. It means that a decision maker has no choice by which they can be aware of those programs and decisions, which are made by others simultaneously. Williamson believes that the secondary uncertainty is considered of non-strategic uncertainty kind. That means that in such cases, a lack of time access due to the information non-disclosure, is not in fact hiding flawed information, rather, it happens as a result of some other reasons such as a country's' notification system backwardness and lack of development in the economic organization.

Williamson poses a third kind of uncertainty named as "behavioral or doubled uncertainty". Behavioral uncertainty occurs when a flawed contract and property limitation are together [34, p. 60].

These kinds of uncertainty are endogenous and related to opportunism behavioral hypothesis and there are many uncertainties of this kind identifiable in advancing countries.

4.1. Theoretical framework. According to the posted ideas, the researcher of this paper used two groups of the ideas to express the inflation uncertainty phenomenon and its impacts of the municipality's financing system. The first group was consisted of those, which were posed by some individuals like Friedman, Ball, Cookerman, and Maltzer. These ideas were mostly observers of the type of "inflation" relationship and "inflation uncertainty" and try to evaluate the cause and effects relationship of these phenomena and how they affect others.

However, the second group of the ideas was related to the institutionalism economists' perspectives such as North, Williamson, and Cooyman who posed their ideas in relation to the inflation uncertainty phenomenon, by focusing on transaction costs economy. These ideas aimed to realize the ideas related to the inflation uncertainty phenomenon and its impacts on the economic structure of the country by questioning the principles of neoclassic economy.

Having stated the all above statement:

– In order to express the existence of inflation uncertainty factor in municipalities' financing system (for instance: Tehran municipality), the researchers took advantage of the first group

– And in order to analyze the consequences of this phenomenon on urban planning and management system, they used institutionalism followers' ideas.

In table (4), the theoretical framework of the research has been briefly expressed.

The impacts of the observer on the type of the inflation uncertainty and inflation relationship
Institutionalism theory-Transaction costs economy

The first group: Friedman and Ball theory

– Inflation is the reason to inflation uncertainty

– The relationship between these two is positive

– Increasing the inflation leads to inflation uncertainty and decreasing the inflation results in the decrease of inflation uncertainty

– The second group: Cookerman and Maltzer

– Inflation uncertainty is the cause of inflation not its effects

– Increasing the inflation uncertainty leads to the increase in the inflation rate in the society and its decrease results in the decrease in the decrease in the society.

Nort-Williamson ideas:

– The economy of transaction costs has questioned perfect rationality hypothesis of neoclassic economy and tries to modify it.

The hypotheses of transaction costs economy:

– First, rational actors act in this process but they face two limitations in showing rational behaviors: the information is flawed and the individuals cannot access to all the information. Therefore, they make their decisions according to a steady informative basis.

Second, even if the information is accessible, the actors' computational capability is not much enough to be able to calculate all the events and probabilities and make the right decision accordingly.

– Williamson believes that the duty of transaction costs economy is to decrease the risks due to opportunism (which observes the past events) by choosing the organizing method of the observer on the future of the activity of transaction costs economy.

– Uncertainty (primarily, secondary and doubled) leads to increase in the transaction costs.

The theoretical framework of the research

– Taking advantage of the observer's ideas regarding the type of "inflation" and "inflation uncertainty" in order to express and discuss the existence of inflation uncertainty factor in municipality financing system

– Taking advantage of institutionalism economy theory orienting towards the transaction costs economy to analyze the consequences of inflation uncertainty on the urban programming and management system.

5. Research background. According to the presented theoretical framework, there have been different studies carried out in different countries and using different models, which the uncertainty variable has been calculated. The results of each of these studies have been different based on the structural characteristics of the countries. For example, Grier–Perry, in their study on G7 countries, show that inflation uncertainty in some countries such as Japan and France creates incentives in politicians to make sudden inflations and hence, inflation uncertainty leads to an increase in the average level of inflation accordingly. On the contrary, in the rest of the G7 countries-because of the politicians' consolidation policies- inflation uncertainty has decreased the average rate of inflation [7, p. 55].

Joyce, using GARCH, EGARCH, AGARCH models and the prices index of retailing in England, found that the inflation uncertainty is in a direct relationship with inflation [16]. Kontonikas, using monthly data and the CPI seasonal index of retailing prices in England for a time interval of 1972–2002 by using the different techniques of GARCH models, studied the long-term and short-term impacts of inflation uncertainty [18]. In his paper, he showed that the results of symmetric,

Table 4

The summary of theoretical principles and the theoretical principles of the research

The impacts of the observer on the type of the inflation uncertainty and inflation relationship	Institutionalism theory-Transaction costs economy
The first group: Friedman and Ball theory – Inflation is the reason to inflation uncertainty – The relationship between these two is positive – Increasing the inflation leads to inflation uncertainty and decreasing the inflation results in the decrease of inflation uncertainty – The second group: Cookerman and Maltzer – Inflation uncertainty is the cause of inflation not its effects – Increasing the inflation uncertainty leads to the increase in the inflation rate in the society and its decrease results in the decrease in the decrease in the society.	Nort-Williamson ideas: – The economy of transaction costs has questioned perfect rationality hypothesis of neoclassic economy and tries to modify it. The hypotheses of transaction costs economy: – First, rational actors act in this process but they face two limitations in showing rational behaviors: the information is flawed and the individuals cannot access to all the information. Therefore, they make their decisions according to a steady informative basis. Second, even if the information is accessible, the actors' computational capability is not much enough to be able to calculate all the events and probabilities and make the right decision accordingly. – Williamson believes that the duty of transaction costs economy is to decrease the risks due to opportunism (which observes the past events) by choosing the organizing method of the observer on the future of the activity of transaction costs economy. — Uncertainty (primarily, secondary and doubled) leads to increase in the transaction costs.
The theoretical framework of the research	
– Taking advantage of the observer's ideas regarding the type of "inflation" and "inflation uncertainty" in order to express and discuss the existence of inflation uncertainty factor in municipality financing system – Taking advantage of institutionalism economy theory orienting towards the transaction costs economy to analyze the consequences of inflation uncertainty on the urban programming and management system.	

asymmetric, and GARCH quasi models, show a positive relationship between the past inflation and future uncertainty and they are in fact confirming the cause model of Friedman and Ball. Mehregan, Salmani, Sohrabi [20], studied the relationship between Tehran inflation and its municipality revenues. Their studies show that increasing the prices leads to an increase in urban management costs on one hand, and on the other hand, by decreasing the purchasing power of the citizens, it has been hard for Tehran municipality to apply the compensatory policies (for revenue). Moreover, sometimes, it is said that, by applying the policy of increasing the costs of public services, the increase in the revenues of Tehran municipality, will result in the increase in inflation in Tehran city. In other words, this means that applying such policies would double the problem.

6. The financing system of municipalities in Iran. Since the beginning of the formation of municipalities as the most important institution in charge of the cities in Iran, there was never the issue of financing this public institution in the form of the macroeconomic system of the country discussed. But since 1987, by the self-sufficiency policy of the municipalities in the form of annual budget and also emphasizing on this issue in the form of law of the first development programs of the Islamic republic of Iran, the unstable trend of revenue resources of municipality was intensified and more attention was paid to the unstable revenues such as selling density as a reaction of urban management in opposing to the decrease of resources. Hence, the share of revenues from selling density in the total revenues of country's municipalities increased significantly. The carried out studies on this issue show that the taxes on construction license and selling density is about 34 %, but this kind of revenue is only 0.5 to 1.25 % in some of the selected countries of the world such as Spain, Germany, Japan, South Korea, Turkey (the RM and municipalities organization in the country). This situation has changed the stability, vulnerability from the total conditions of national economy, especially in the field of land and housing, organizational and management inefficiency, the continuation and increase of the tendency to tax evasion, the existence of long term bureaucracy on the way to make organizational and legal reforms and the existence of the injustice fields in urban management behaviors into the dominant procedures in the financing system of the countries' municipalities. Hence, today, gaining constant and stable revenues for the municipalities is considered as an essential part in urban economic growth and a strategic sector in meeting the citizens' needs in advancing cities and the importance of this issue is so much that there has been a specific emphasis given to it in the urban development programs. In the meantime, inflation factor can affect the continuity process and the stability of municipality's' revenues levels. This feature can be considered as a scale for expressing the macroeconomic situation of the country and on the other, the fluctuations and deviations of its unpredictable parts can be viewed as characteristics of the instability and uncertainty of the different economic levels (such as urban areas economy) [12]. The reason to considering the increase and successive changes in the inflation rate as "inflation uncertainty" is that it puts the economic situations in unpredictable and uncertain conditions.

Okun first posed the inflation uncertainty in 1971. Using statistical analysis, he found that those countries having a higher inflation rate have generally higher inflation fluctuations. Therefore, Okun used the abovementioned changes as an index for uncertainty and believed that high inflation rate is accompanied by inflation uncertainty. In his idea, uncertainty about the inflation leads to a deviation in the consumers and producers' decisions on savings, consumption, and investments. These deviations will have negative impacts on the resources allocation efficiency and real economic activity level. The existence of inflation uncertainty makes the costs of economic agents doubled, because a part of their resources will be consumed for predicting the future inflation in the existence of uncertainty in the market and in fact, will affect the loss or benefits of manufacturing firms [27].

In Iran, the beginning of inflation period refers to 1970s. In this decade, the existence of oil shocks (increase of oil price) was of the main reasons to the increase of inflation in Iran. It was so that in the 1960s, the average of inflation rate was 2 % and its standard deviation was 5 %, while in 1950s, the inflation rate average reached 11.3 % and its standard deviation was 9 %. The occurrence of the Islamic revolution of Iran in 1978 and political and social changes of Iran in post-revolution years, the eight year war between Iran and Iraq, budget pressures, the limitations of the supply party, population increase, demand pressure, and forming the inflation expectations were the main factors in increasing the inflation in 1980s and 1990s. It was so that the inflation average was 15 % and its standard deviation was 5 % in 1980s and in the first half of the 1990s, the inflation rate was 31 % with a standard deviation of 11 % [8, p. 91]. Therefore, it can be concluded that the existence of growing rates of inflation and prices instability have imposed

some costs on country's' economy through inflation uncertainty.

The existence of inflation uncertainty in macro economy system in a hierarchical system penetrates to the middle and micro levels easily. Hence, it would be safe to state that the created inflation uncertainty in the macro economy level will be able to affect the financing system and economic structure of the country's municipalities as the main in charge institution of urban affairs. In order to evaluate and analyze this claim, the inflation rate of a 13 year time interval (2001–2013) has been studied to evaluate the impacts of the changes of this rate on the trend of Tehran (for instance) municipality revenues.

7. Model estimation. In this part, the researchers first did the reliability test. To do so, they used two generalized Dickey-Fuller and Philips-Brown tests. The results of the two tests are shown in table (5). As it can be obviously concluded from the results of Unit-Root test, all the variables except the inflation uncertainty variable are in a stable level. Therefore, since the variables of this study are I (1) and I (0), the researchers used self-explanatory method with distribution lags (ARDL) to study the relationships between the variables.

The name of the variable Dickey Fully Philips — Brown the degree of accumulation.

7.1. Estimating ARDL model. At this step, the researchers first study the long term relationship between the variables. Using the model lags test to calculate the threesome revenue seasons of Tehran municipality, –1.13, –0.64, –3.54 were calculated for the first, the second and the third seasons respectively. Therefore, the amount of statistics in Banerjee, et all's table is at the confidence level of 95 % and –3.64 for the intercept model. On the other hand, model estimation for calculating all the revenues of the municipality was done. According to the obtained results from the ARDL estimation model for all the revenues of the municipality, the test statistics in comparison with Banerjee et all's table was calculated to be –0.17 which could be dependable according to the long term equilibrium relationship for this variable. Therefore, the table (6) shows the long-term relationship between the variables in the models.

In the following, the results of the short-term estimation are presented in table 10. The ECM coefficient was a little negative and significantly obtained for all models, which show the movement of the model from a short-term state to the long-term state. In other words, the error correction trends' speed from short term to the long term was 0.92, 0.16, and 0.28 in three models respectively.

Table 5

The results of unit root test of the model variables

The name of the variable	Dickey_Fully		Philips-Brown		The degree of accumulation
	level	The first time difference	level	The first time difference	
INV	–6.029 (0.000)	–	–4.47 (0.02)	–	I(0)
RS	–1.237 (0.650)	–9.905 (0.000)	–2.619 (0.096)	–9.352 (0.000)	I(1)
I1	2.340 (0.894)	–3.6981 (0.030)	–0.3349 (0.912)	–4.249 (0.045)	I(1)
I2	1.510 (0.999)	–3.70 (0.007)	–0.556 (0.870)	–4.025 (0.037)	I(1)
I3	–1.113 (0.703)	–4.0	29 (0.002)	–7.714 (0.833)	I(1)
I4	1.196 (0.997)	–3.89 (0.43)	–0.584 (0.86)	–3.12 (0.034)	I(1)

Table 6

The results of long term estimation of the first season (the first season of the revenues)

Probability	t statistics	Standard deviation	Coefficient	Variable
0.00	22.84	–0.554	1.26	RS
0.48	–1.877	1.235	–2.32	INV
0.42	–2.102	1.110	–2.33	C

Table 7

The results of long term estimation of the second model (the second season of the revenues)

Probability	t statistics	Standard deviation	Coefficient	Variable
0.00	16.343	0.0901	1.473	RS
0.055	–1.974	9.0725	–17.91	INV
0.002	–3.222	1.76	–5.726	C

Table 8

The results of long term estimation of the third model (the third season of the revenues)

Probability	t statistics	Standard deviation	Coefficient	Variable
0.00	31.206	0.694	2.167	RS
0.00	–3.219	3.187	–10.261	INV
0.00	–15.321	1.444	–22.12	C

Table 9

The results of long term estimation of the fourth model (the fourth season of the revenues)

Probability	t statistics	Standard deviation	Coefficient	Variable
0.00	23.30	0.574	1.33	RS
0.04	–1.09	0.512	0.562	INV
0.01	–2.47	1.124	–2.77	C

Table 10

The results of ECM model estimation (the first season of revenues)

Variable	t statistics	Standard deviation	Coefficient	Probability
0.00	7.1026	0.1257	0.767	DI11
0.01	2.7087	0.3925	1.063	DRS
0.02	–2.414	0.4084	–0.986	DRS1
0.25	1.150	0.0269	1.181	DINV
0.00	3.915	1.6477	6.452	DINV1
0.26	2.318	1.7560	4.070	DINV2
0.032	–2.219	0.29764	–0.660	DC
0.001	–3.683	0.76799	–0.282	ECM

Table 11

The results of ECM model estimation (the second season of revenues)

Probability	t statistics	Standard deviation	Coefficient	Variable
0.00	5.706	0.124	0.712	DI21
0.00	2.767	0.860	0.238	DRS
0.26	1.125	0.898	1.011	DINV
0.00	4.185	0.916	3.836	DINV1
0.03	–2.303	0.419	–0.925	DC
0.00	–2.737	0.590	–0.161	ECM

Table 12

The results of ECM model estimation (the third season of revenues)

Probability	t statistics	Standard deviation	Coefficient	Variable
0.00	6.743	0.998	0.6735	DI31
0.00	3.583	1.549	5.551	DRS
0.516	0.656	2.221	1.458	DINV
0.001	3.567	2.260	8.064	DINV1
0.00	–7.177	2.851	–20.466	DC
0.00	–7.006	0.1320	–0.924	ECM

Table 13

The results of ECM model estimation (all the municipality's revenues)

Probability	t statistics	Standard deviation	Coefficient	Variable
0.00	5.557	0.139	0.772	DI41
0.00	3.22	0.111	0.360	DRS
0.00	–2.99	0.287	–0.861	DINV
0.08	–1.793	0.416	–0.746	DC
0.00	–3.334	0.080	–0.269	ECM

Therefore, the calculations show that the inflation fluctuations and the uncertainty resulted from these fluctuations, play an important role in making the financing structure of Tehran municipality unstable during the mentioned years.

8. The impacts of inflation uncertainty on urban management. Stable urban revenues have an important role in urban economic and development growth and they meet the needs of the citizens. In this regard, the inflation rate can affect the stability and durability of the urban revenues rate, because the inflation issue is a factor, which leads to the increase of instability and uncertainty in the financing structure of a city. Generally, the impact of inflation uncertainty on authorities and managers' decisions is different in the different time horizons. It means that short-term uncertainty usually affects the transient decisions, while the inflation uncertainty affects the inter-temporal decisions seriously in the long term [10].

Hence, in this part, using the theoretical concepts and principles of the economy of transaction costs and taking an institutionalism approach, some of the impacts of inflation uncertainty on the body of urban management are listed below:

– Inflation uncertainty makes the financing structure of the municipalities unstable. That is because the inflation rate affects the stability and the durability trend of revenues levels of the municipality and the higher inflation rates lead to the increase of inflation uncertainty. It is obvious that in the existence of uncertainty in the financing structure, the municipality will always face an uncertainty in its planning.

– Inflation uncertainty leads to the increase of transaction costs. As it was stated earlier, these increase if there are not suitable and enough information and on the contrary, it decreases when there is enough information. Now, the nature of inflation uncertainty is so that it makes the urban managers and authorities unaware of future events. Therefore, in most of the times, the urban management authorities evade making long-term decision for the sake of high-level transaction costs.

– Today, private sector investments and participations in urban affairs management and social and economic plans are welcomed by the municipalities. However, in fact, the dominance of uncertainty atmosphere on the future events and the lack of clear and enough information have led to the fact that the participation level of the private sector be at a low level in the municipal activities. Rahmani and Mazharis' studies prove this claim in relation to the limitations on the way of private sector participation in the municipal services deputy of Tehran municipality [28]. Their studies show that the level of established assignment of the duties to the private sector (actually done) has been less than the level of assignment capability (potentially) in all the related organization to Tehran urban services. Using Antro

and survey method, they found that the existence of bureaucracy in contracts and salary payments, uncertainty atmosphere in investment and contracts' low prices were the most important problems and barriers to the participation of private sector contractors in municipal activities.

– Another result of the inflation uncertainty which has been affective on increasing the participation level of private sector in municipal activities is that the expected feedback rate of the investor increases due to the uncertainty conditions, and this cause the investments be postponed as much as the uncertainty level. Hence, urban managers' planning, for making mutual investments will be delayed.

– By the way, the risk resulted from the inflation uncertainty has become an important barrier on the way to private sector participation. That is because this factor affects the loss or the benefit of manufacturing firms directly and increases their activities' risks.

– The existence of uncertainty regarding the future events leads to a situation in which the private sector investors decrease their contract period in order to do mutual economic activities. That is because the decrease in the contract period reduces the loss risk to the parties. Hence, the level of municipal long-term investments, which are accompanied by the private sector, decreases significantly.

– The lack of considering the inflation fluctuations rate in those contracts, which urban managers sign with the private sector, can create conditions in which opportunist individuals could misuse this issue as a contract flaw and finally the contract would be violated and cancelled. Therefore, there will be some costs imposed on the urban management due to the unfinished contracts.

– Inflation uncertainty leads to decrease the decision-making horizon of managers and urban planners because it creates situations in which the probable events may happen in future are not clear and the possibility of each one's occurrence is not accessible, even if they are predictable. Therefore, it would be hard to make decisions regarding the future and consequently, uncertainty atmosphere would dominate the decisions. Hence, urban mangers prefer to make plans for the short and mid-term periods.

– High inflation rates lead to the increase of long-term interest rate in the financial markets. This affects the savings, consumption, and investment level, whereas linking the municipal revenues to the urban economic potentials is one of the actions of Iran's' municipalities to stabilize the financing system of the city. Therefore, due to the inflation uncertainty and increase of long term interest rate, the amount of such municipal economic activities have been decreased and the capitals are saved in banks to get more benefits. It is clear that in such situations, the economic activities will be decreased.

– An important problem which Iran's municipalities as the main urban management arm are facing is the lack of budget allocation to this institution based on the future inflation because the amount of this institution budget is approved by the cabinet, but the inflation rate which appears during the year and actually reduces the purchase power of the municipality, is not considered in this budget. Therefore, it can be seen that the urban managers face budget deficits in administering approved projects. In such situations, it is stated that if the amount of the payments are not adjusted with the inflation rate, the value of future payments will face uncertainty too.

— The existence of inflation uncertainty cause the municipalities as an institution, which are involved in urban economic activities, face extra costs. That is because a part of the revenue resources of the municipality is expended on predicting the future inflation and participating in related risks.

– Finally, where there is inflation uncertainty, the municipality as an institution embarking in economic activities, is not aware of its future nominal payments and finally the financial decisions of the authorities and managers will not be real.

9. Conclusion. The researchers were going to study the impacts of inflation uncertainty on the financing structure of the municipalities and their impacts of this phenomenon on the urban management. To do so, they attempted to evaluate the existence of instability due to the inflation in the financing structure of the municipality (for instance: Tehran municipality) at the first step. Therefore, after obtaining the revenues of Tehran municipality during 2001–2013 and studying the different methods of evaluating inflation uncertainty, the researchers took advantage of the financing structure of this city.

In order to study the impacts of inflation uncertainty on the financing structure of Tehran municipality, the researchers used the below base model using the seasonal data of 2001 to 2013. In fact, there were three models estimated in this paper, which in each of them the different revenue seasons of Tehran municipality was used as a dependent variable. In other words, this model is going to evaluate the impacts of inflation uncertainty on the threesome revenue seasons of Tehran municipality.

$$I_{it} = \beta_0 + \beta_1 INV_t + \beta_2 RS_t + \varepsilon_t,$$

Where, I: is Logarithm of municipal revenues (I is the symbol of each on municipal seasonal revenues)

INV: Inflation uncertainty rate

RS: Total added value of service and construction sector in Tehran and ε is the symbol of disrupt.

Furthermore, the researchers used EGARCH method to obtain the inflation uncertainty rate. In the following, model lags test was used for the threesome revenue seasons of Tehran municipality for the first to the third season, which were calculated –1.13, –0.64, and –3.54 respectively. Nevertheless, since the Banerjee, et all's table (statistics value) is in 95 percent at a confidence level and –3.64 for the intercept model, the existence of long-term relationship between the variables is approved. On the other hand, model estimation was done for the total municipal revenues. According to the obtained results from the ARDL dynamic model for the total municipal revenues, (test parameter) was estimated to be –0.17 compared to the Banerjee, et all's table which it could be assured that there is a long term balance relationship for this variable accordingly (tables 5–9).

Therefore, the results of the estimations show that there is a positive relationship between the inflation rate and uncertainty. It means that high inflation rates bring about inflation uncertainty. In such situations, the existence of inflation uncertainty is one of the most important factors in the instability of Tehran municipal revenues. This has led to a situation that the financial power of the municipality be lower than it is expected to.

On the other hand, inflation uncertainty factor affects the municipal economic activities and results in the increase of transaction costs, investment decisions deviations, the lack of optimized recourses allocation, the decrease of decision making horizon, and high risks of activities. All the stated factors directly or indirectly make the financial structure of the municipalities fluctuated and move towards instability.

In the second part of the research, the impact of inflation uncertainty on the urban management was studied. To do so, the researchers used the principles and frameworks of transaction costs economy, which has been posed by the institutionalism follower. In economics, it is stated that the transaction costs are those costs, which happen to be in an economic transaction. These costs increase if there is not enough information and decrease when there is enough data. Here are some of the factors involving transaction costs: searching for and obtaining information, contract costs, law making and law enforcement. However, where there is inflation uncertainty, transaction increases consequently. A major part of these costs are due to the lack of enough information about the future economic situations, future inflation, interest rate fluctuations, uncertainty about the investment return rate, and the probable loss or benefits. In such a situation, and in order to minimize the risks of transaction costs increase, the municipality ought to make short term and mid-term plans and policies, because changes in economic situation in the long term can easily menace the profitability of different projects.

On the other hand, since earning economic benefits justify the existence nature of private sector, if there is uncertain economic activity, the economic profits of this sector will be over shadowed and hence, the level of private sector participation in municipal social and economic activities will decrease severely.

10. Recommendations. Since there is always inflation in advancing countries and Iran's country is among the first ten countries in this regard, it is necessary to study the changes of this index and inflation uncertainty phenomenon, their impacts of economic firms' decisions and different public and private institutions.

The municipalities act as institutions, which are involved in urban planning and management specifically in Iran and obtaining stable revenue, is considered as a very important issue to the municipality; while paying attention to the inflation uncertainty is unavoidable. As it was stated earlier in, this paper that is because the inflation factor exaggerates the financial power of the municipality, which this brings about the increase in the expectations of the public from the municipality. Hence, it is recommended that:

– The urban management body puts the real municipal revenues as a criterion and makes plans in the city accordingly.

– The future inflation rate is taken into account for the municipality in the annual budgeting, so that this organization can do its wide duties.

– Urban managers, while making contract with the public and private sector, ought to consider the future inflation to keep the level of municipal economic profits and not to be a kind of pretext for cancelling the contract by the other party.

– In order to attract the private sector investments and make up the losses due to the inflation uncertainty, the country's' urban managers should use other financial incentives such as exemption of toll payments, the facilitation and shortening the ministerial affairs, participation in the final profits.

– The base rate of municipal revenues should be adjusted according to the increase of inflation rate.

For instance, one of the rows in sustainable revenues and very important to the country's' municipalities, is modernization tolls which is determined according to local prices announced by the Department of Economic and Finance Affairs, but because of the lack of local updated prices, the level of obtained tolls from this row is less than what is expected.

– Finally, the action which is supposed to be done in macroeconomic level and definitely affects the financing structure of the municipality, is taking advantage of other countries'' successful methods in the field of inflation uncertainty controlling. England has chosen inflation targeting policy and required its central bank to obtain a specific inflation rate in a specific time interval. The studies show that this policy has been able to decrease the inflation. Therefore, one of the posed recommendations is inflation targeting in this field to obviate the damaging impacts of inflation uncertainty.

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