PREDICTION MARKETS AND THE SPANISH ELECTION PROJECT

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Abstract

The aim of this paper can be divided into two principle categories. Firstly, prediction markets will be explained in terms of their potential use in society and their market mechanisms. A brief introduction based on prediction markets including all their elements is given. Once we have introduced them, we will analyse the way in which prediction markets have evolved from what they once were and look at their uses now, in modern day society. This will be combined with a literature review.

As part of our work, we have also formulated our own market and we demonstrate how it can be tested using the Policy Oracle platform. Our project will consist on making predictions about the political future of Spain, forecasting the possible 3rd general elections of 2016. Once we have obtained the results from our project, the next step will be to make an analysis of our results and deduce any conclusions.

Prediction Markets and the Spanish Elections Project

Listing, Formulas and Graph List

1. Introduction

Prediction Markets, also known as information markets, can be defined as markets where subjects share contracts whose payoff depends on future events. Each transaction is made with the information and risk adversity that each user has in each moment.

The different kind of contracts that are shared will give different statistical information in order to meet the objectives that predictions markets have, which are to forecast future events with more accuracy than traditional methods.

The high accuracy of forecast obtained by prediction markets has led to an exponential growth in related literature and research, provoking a growth in their uses in society.

Due to the good results achieved in recent years, prediction markets have been used in private and public sector predictions with a large variety of applications, whereby elections, sales or medical issues forecasts are just some of the great types of applications that future markets are having nowadays.

The evolution and diversity of prediction markets have made them the perfect union point between private investment and general public interest.

As part of our work on global markets we will create our own market to forecast the possibility of Spain's 3rd elections, with the goal to predict the future government and different aspects of it. Our market will proceed the different thoughts of our subjects, making variations in the price, and letting us predict the political future of Spain. To accomplish that, we will upload our own contracts in a European platform used to predict economic changes.

Before we continue the study we must take several factors into account. Several reviews have been produced on prediction markets based upon current markets or those that previously existed. Furthermore, this is why in this study we aim to focus on basics rather than giving detailed explanations on all the types of markets mechanisms or market organisation.

2. Related Literature

The emergence of Prediction Markets as a forecasting tool is quite recent, however many authors have undertaken several investigations throughout the years in order to identify how those markets work and explore the accuracy of the results gained from them.

The very first studies on this topic are the series of articles that Hanson published between 1990 and 1992. The first publications and applications however are prior to this date, University of IOWA started in 1988 the Iowa Electronic Market, this project had two different goals, to analyse the market dynamics in Prediction Markets and to forecast the results of US presidential elections. The first academic paper about the Iowa Electronic Market was written in 1992 by Forysthe, Nelson, Neuman and Wright (Forsythe, et al., 1992). In the 1990 decade most of the work was dedicated to Political Stock Markets, which were mainly based upon of the more famous market, the Iowa Electronic Market, as an example (Berg, et al., 1996), (Berg, et al., 1997) (Forsythe, et al., 1992) among many others.

After 1998 we witnessed an exponential rise in the literature based on Prediction Markets as well as an increase in the topics discussed in the literature.

As we can see in the work of (Tziralis & Tatsiopoulus, 2007), the literature published between 1998 to 2007 can be separated into four broad categories, description, theoretical work, applications and law. In this paper, we will define each category as well highlight the main papers within each group.

The first category, description, covers all the descriptive research made on Prediction Markets. In this section, we can find subcategories where papers such as (Wolfers & Zitzewitz, 2004) give a general description of the prediction markets, whereas the work of (Hanson, 2003) involves market modelling.

Within the category theoretical work, several principal papers explain fundamental ideas such as; the prediction's market theory, aspects such as market design, modelling, information aggregation and others. Bergfjord's (Bergfjord, 2006) and Chan's (Chan, 2001) contribution to prediction markets is highly praised amongst economists. Berjford has been praised for his work analysing the advantages of using such markets, preventing political risks and Chan for his work that focuses on producing and analysing different types of prediction markets as well as market makers.

In the next category Applications, we can find all the papers that explain or analyse the applications of the prediction market concept. The work of (Chan, 2001) has enabled us

to understand the full potential and limitations on prediction markets. In addition to this papers based on IEM, such as (Berg, et al., 2001) (Berg, et al., 1997) or (Forsythe, et al., 1992) are also remarkable in this field, for their contribution to understand why a market can be an accurate predictor as well as the limitations that prediction markets have.

Finally, the last category we will discuss is law and policy. In this category we can find both types of articles.

We will consider prediction market papers based on law, considering all the papers in which the legality of Prediction markets is discussed. We will also take into consideration the ones in which prediction markets are used to solve several law problems. It can be considered that the most relevant work on PM applications in law is (Abramowicz, 1999) whose work was focused on applying market mechanisms on legal values and legal issues.

On the other hand we will consider the work on Policies, all the work in which policy making or policy analyst work is discussed. It can be considered that the most important contribution in this field was by (Hanson, 2006). Hanson's work discussed the implantation of the Policy Analyst Maker (PAM), which was firstly uploaded to determine futures signs on terrorism. However, it is important to be aware that although this market was intended to prevent terrorism, the market had to be shut down because of the risk that terrorists could use the data provided by the market.

3 Prediction Markets

Prediction markets, also well known as Future Markets or Information Markets, do not have a global definition, in this document we are going to use the definition of (Wolfers & Zitzewitz, 2004): Predictions markets are markets where participants trade contracts whose payoffs are tied to a future event, thereby yielding prices that can be interpreted as market aggregated forecasts.

We would also like to use the definition given by (Joyce E. Berg, 2003); Prediction markets are defined as markets that are designed and run for the primary purpose of mining and aggregating information scattered among traders and subsequently using this information in the form of market values in order to make predictions about specific future events.

Having understood both definitions we can clarify certain aspects about future markets. Firstly we can see that the information is given by traders who operate in the markets, sharing contracts about future events. The payoff of the operators depend on the success of future events. The share price of the future contract would then be used to create predictions about the future event.

In a perfect market, the price given by the experiment would be the best indicator for making predictions about future events. Although prediction markets are not strictly perfect, the great results obtained as predictors in the last decades, have generated a rising interest in this field.

The contracts that we can see in a prediction market are divided into 3, winner-takes-all, index and spread (Wolfers & Zitzewitz, 2004). Each contract's payoff works differently and the results will give us different kinds of information. In order to know how the different contracts work and what information they give to us, we will introduce each kind of contract and we will illustrate the explanation with an example, with the intention to make the understandability of the text easier.

We will use the event 'y' on the examples, which will be placed on the USA's 2016 presidential elections and it will be introduced in cursive.

Winner-takes-all contract's payoff depends of the success or not of a determined event. *Contract pays 1$ if Donald Trump win the elections, if not 0.*

In the Index contract, the amount of money that the contract pays will vary depending on the percentage of success of the contract. *Contract's payoff depends on the percentage*

of the vote that Donald Trump will get on the next USA election, giving 1$ for each percentage point obtained.

Finally on spread contracts, when the chances of winning and losing are the same and equal to 50%, the contract pays double money when the results are above the established value, and they pay 0 if the results are below. *Contract will pay double money if Hillary Clinton has more than 45% of popular vote, the contract will pay 0 if not.*

Each one of those contracts will give us different economical statistical information (Wolfers & Zitzewitz, 2004). First of all, on winner-takes-all contracts, the price of the contract would show us the market expectation of the probability that this event occurs.

Due to the nature of index contracts, being that they pay money for each point reached, index contracts will give us the mean value of the prediction.

Finishing on- spread contracts, established value will give us the median, for the nature of the contracts, a spread contract will only be fair when the probability to occur of an event is the same as to not occur.

3.1 Prediction Markets, Historical View

The very first piece of work produced on Prediction Markets was done in the early 90's. Robert Hanson's work was one of those produced in the early 90's and his work was based on a theoretical approach to prediction markets. A couple of years before, in 1988 the Iowa University started to work on a project, the Iowa Electronic Market (IEM), the IEM was meant to predict political dynamics and forecast the US elections. (Forsythe, et al., 1992) Was the first work on the Iowa Electronic Market. In this document the authors started to analyse the positive results of the experiment. They also concluded that if the market had enough people who did not have a judgement on whether it will be able to work well, and for instance be a really good predictor.

In the following years the work on prediction markets was mainly focused on the same sector, political stock market. The work of (Berg, et al., 1997) was remarkable, in the way in which they used the data given by the IEM to identify the factors that make the markets great predictors of future events in the long-run.

In 1998 there was a breaking point in prediction market research, whereby a sudden rise in Prediction Market literature was observed. Alongside this rise in prediction market research, the quality and the diversity of the research also showed exponential growth.

As we explained previously, in our literature review, future market research can be divided into sections based on the nature of the work: Introduction, Theoretical Work, Applications and Law.

As the intention of this section is give the reader an understanding of the evolution of prediction markets, we will focus on two sections; theoretical work and applications which can be considered more significant on the development of prediction markets.

We are able to observe a constant evolution in prediction markets from 1998 to today. The most important changes regarding the theoretical work based on prediction markets were made on the way that the market determines how the orders of the participants are going to be shared, the market mechanism. Through the years many mechanisms have been used, however Continuous double action (CDA) (Berg & Proebsting, 2009) and Automatic market makers (AMM) (Hanson, 2003) are the most commonly used.

Nowadays the use of them is directly related to the type of market that we are working with. The principal difference between them is that an AMM algorithm will process the order, no matter if there is some order to match. While using CDA requires an opposite order to process the share, which is inconvenient when we are in a small market.

The increase in applications of such markets have also been exponential.

Prediction markets have recently been used in the public and private sector, for example companies such as HP are making better predictions on their future sales than the ones made using their traditional methods (Ploot & Chen, 2002). Also Hollywood used these mechanisms to forecast the success of their films with the Hollywood stock exchange, HSX which made better predictions than experts on films. (David, et al., 2001)

Within the public sector (Polgreen, et al., 2006), work based on future markets can be key to providing relevant information about future activity for infectious diseases. This is one example of many, which demonstrates the way in which prediction markets have advanced through the years and have become a union point between private investment and public general interests.

3.4 Prediction Market Uses and Accuracy

We would like to explain some prediction market's uses and the importance that they have as predictors, that is why we will introduce some of the principal information markets uses on different topics. The uses and the importance of prediction markets as predictors are explained in this section with the use of several examples.

Firstly, we will mention the work of Richard Roll (Roll, 1984), where the price of oranges is used as a weather indicator. The exercise could show the relation between orange prices and weather, due to the existent relation between the bad weather and the problems with the oranges grown, making them more expensive. The study results obtained from the prediction markets for the orange prices based on weather were more accurate than the meteoroidal expert predictions.

Another example of early evidence on prediction market accuracy is that of (Figlewski, 1979) where horse races were used to compare the efficiency of predictions made between specialists in betting and predictions made by an information market. This can be considered the same as comparing subjective information with statistical information; hence the latter is more accurate.

Another example of Prediction Market accuracy is the concept brought about by Tradesport, whereby in this case the winner-takes-all contract was paying $100 if Hussein was caught and outside no longer in power by June 2003, and nothing otherwise. In the following graph, (Wolfers & Zitzewitz, 2004) we can see a relation between the variation of the contract price co-moved with experts opinion about going to war with Iraq and Oil prices on the graph 1.

As we can see from the graph 2, the predictions of success and the real success of the films were extremely accurate.

HP Information Aggregation Mechanism (HP IAM), is another example of applications of prediction market in privates business. HP IAMS's market was created to forecast sales aspects, where members of production chains were selected to participate in a small market. As we can see from (Ploot & Chen, 2002) the results of HP IAM were favorable compared to HP's traditional work. The results prove that in 6 out of 8 events the IAM forecasts were closer to the actual final outcome, even the absolute errors were lesser than before with IAM.

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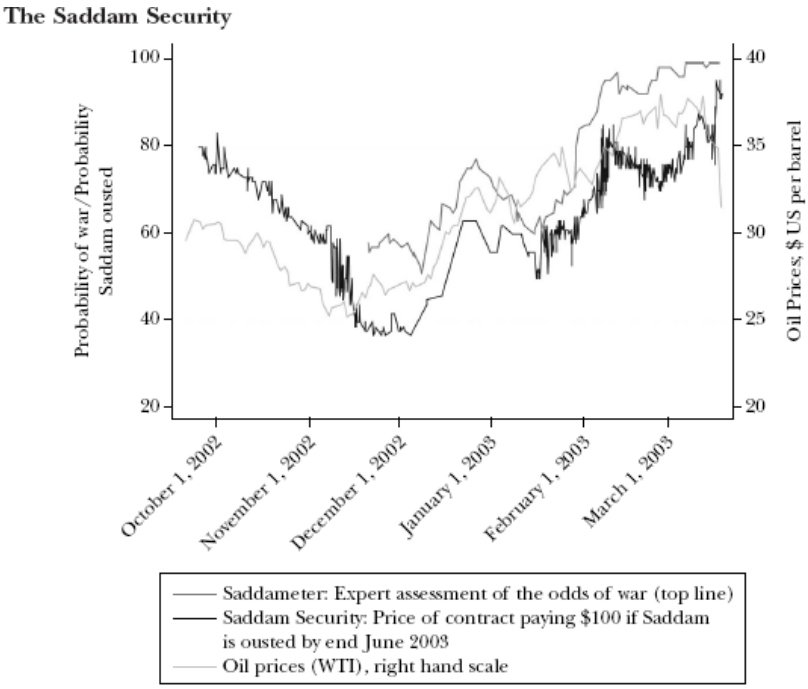
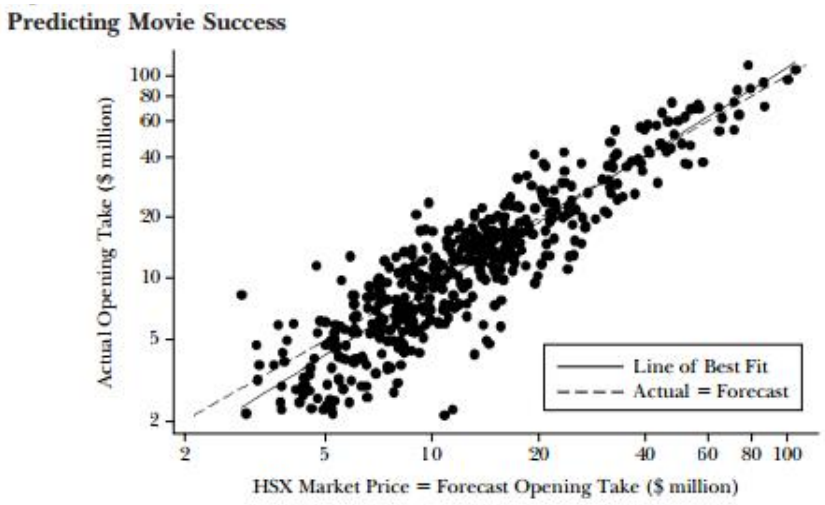
Graph 1: Saddam Hussein power vs oil prices



Source: Wolfers, Justin and Zitzewitz, Eric, "Prediction Markets," Journal of Economic Perspectives,18(2), Spring (2004)

Continuing with prediction market accuracy, another good example is the Hollywood Stock Exchange, whereby the success of a film is predicted as well as other aspects within Hollywood. As we can see, the work of (David, et al., 2001), the predictions of success were highly accurate in most of the cases.

Graph2: Predicted movie Success vs Real Success



Source: Justin and Zitzewitz, Eric, "Prediction Markets," Journal of Economic Perspectives,18(2), Spring (2004)

Another example of the accuracy of prediction markets was a project based on the use of prediction markets to obtain information about future activity for infectious diseases. As we can see in the work of (Polgreen, et al., 2006), the accuracy of the predictions made by prediction markets were better than the ones made by polls.

Finally, we will explain in detail the Iowa University prediction market (IEM), based upon Predictions Markets Accuracy. We have chosen IEM for two principal reasons. First of all, as an introduction to voting systems, given that our project exposed on this work will be related with voting systems. The second reason is that IEM is probably the most famous and relevant Prediction Market known.

Like any other prediction market we can consider IEM as a set of experimental markets where future contracts are traded in the present. The University of IOWA created a

variety of markets in 1988 and nowadays they claim that the total error forecasting the outcome of the elections is of 1.37%.

Most of the experts agree on the success reached by IEM, which is said to be a result of its simplicity. There are a few possible events in each market, those market payoff is on mutually exclusive events, a set of mutually exclusive events is called a basket.

In order to access the market, we must exchange 1$ for a basket of goods. The contract will pay 1$ for each contract that we have if the event happens. In this way, the price will forecast the probability of each contract to occur in the election market, and the earning of the user will give the difference between the final payoff (1$) and the contract price.

In addition to this, it can be considered that by using this method, IEM cannot lose money, as you must buy a basket to hold a position.

Each user can open an account with 5$ to 500$, which is also an internal rule to make sure that speculators are not able to influence the price abruptly.

4. Spain Elections Project

In order to see how a prediction market really works we wanted to design our own experiment, based on the possibility of Spain's 3rd elections in the year 2016.

To make it possible we worked with Symphony Project, without whose help we could not extract any conclusion. The aim of this project was to predict the political future of Spain, and make the more possible accurate predictions of them.

4.1 Spain, Political Approach

In order to understand the experiment we will introduce Spain's Political Situation. First of all we should know that Spain's Political situation is delicate.

In the last decades, after the transition from dictatorship to democracy, two principal parties have always governed the country. Partido Popular (PP) and Partido Socialista Obrero Español (PSOE) have been changing the position between govern and opposition.

Changes in the perception of the acts that those parties have done throughout the years, alongside the corruption cases which have been involved in the recent years have provoked the belief amongst Spanish citizens that a big change is necessary on the political panorama in Spain.

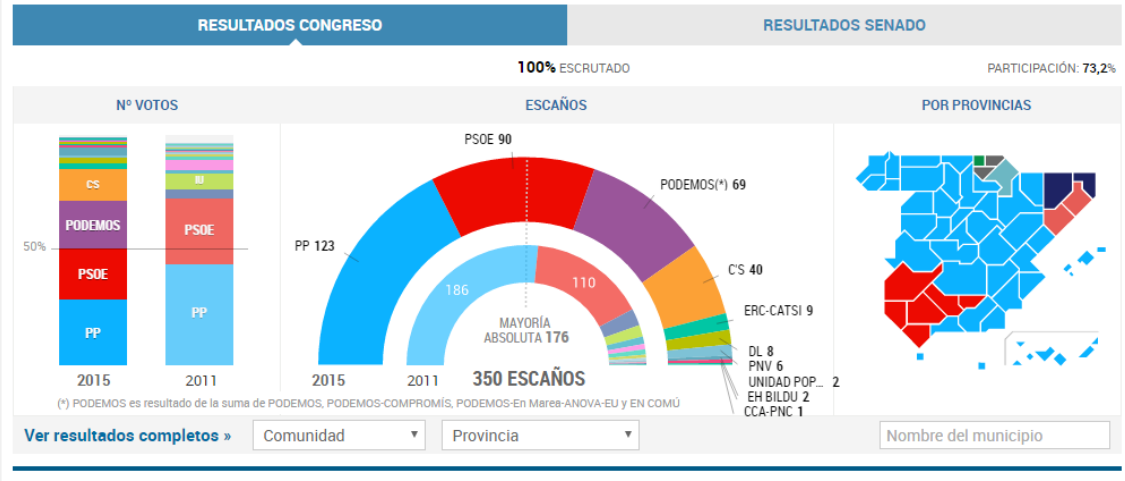
Due to the fact that new parties have been created and raised on the support of the Spanish people and the power that they have on the institutions, PODEMOS and CIUDADANOS have experimented an exponential growth.

A good example of this is the results that they obtained on the autonomic elections in 2015, whereby they came into power in some important cities such as Madrid, Barcelona or Valencia.

On this conjecture we arrive to the first elections of Spain, one of the most controversial elections in Spain, due to the general disappointment amongst people towards Spanish governance.

The first elections were in December of 2015. Taking into account that the Spanish chamber has a total of 350 benches, 176 benches are needed for the majority of the chamber. The results produced are below.

Graph 3: December 2015 Spanish Elections Results



Source: http://elpais.com/elpais/2015/12/20/media/1450594744_312762.html based on 2015 Spanish general elections

Graph 4: June 2016 Spanish Elections Results

Source: http://resultados.elpais.com/elecciones/generales.html based on June 2016 Spanish general elections.

As we can see on the graph 3 none of the parties succeeded on the absolute majority and agreements were needed in order to rule the country. Given that PP and PSOE have been natural enemies through Spanish history, and the incapacity of PSOE Podemos and Ciudadanos to form a govern, meant that another set of elections had to be arranged. Following the inability to make agreements and in order to abide by the law, a second set of elections were fixed for June 2016.

After the June elections, graph 4, results differed to that of December, however the situation remained the same, where agreements were required to rule the country, and no party had the authority to govern alone.

In this situation and with the real possibility of Spain's 3rd elections, is when the Spanish Elections project was made.

4.2 Policy Oracle

As part of our work we are going to use Policy Oracle, a tool made for Project Symphony, which is why we would like to do a small introduction about it.

Policy Oracle was made in order to satisfy one of the bigger problems that has occurred in recent years and overcome the crisis and prevent new ones. It is clear that new tools and programs are needed to understand the complex global dynamics on the economy.

With all these concerns, a tool to analyse market dynamics, with the aim to prevent and mitigate financial crisis, was created. Fostering an economically and ecologically sustainable growth path.

Policy Oracle is a collective intelligence platform specifically designed to newscast information on Policy indicators and support Policy Maker's decisions.

The information market has the purpose of aggregating information and expectations from stakeholders, whereby the information will be about financial stability and sustainability transition.

As a Prediction Market, Policy Oracle will collect information about the transactions made about the contracts posted on the website. Those transactions will be made by the stockholders, once the questions are posted. The aim of this process is to make a prediction about the indicators that they are interested in, giving the policy makers and policy model producers' valuable information to adjust their policies.

The contracts will not be paid with real money, Policiy Oracle contracts work with Play Money, i.e points. 2000 points are given to each user when they register, the final amount of points will depend on the skills shown trading and predicting the different contracts posted.

It is clear that markets where contracts play real money produce better forecasts than markets where stockholders do not have a financial risk. Real money raises the participation and reduces the influence of random answers. However, the work of (Wolfers & Zitzewitz, 2004) proves that markets that operate with play money are also remarkably accurate and have equally valid predictions.

4.3 Market Mechanisms.

We can define the market mechanism as the way that participants share their contracts.

We discussed the proper mechanism that we could use, in collaboration with the National Technical University of Athenes (NTUA), principally with Efthimios Bothos, a senior researcher in NTUA.

We discussed with our contact on NTUA, Efthimios Bothos, the market mechanism that could fit better with our project. We agreed that the best option would be using the market mechanism used by Policy Oracle.

The project design is based on an Automated Market Maker (AMM) trading algorithm. The main function of the Algorithm is to process all the orders given by the market. All the orders given by the traders will be processed as if there will always be a buyer and a seller, which means that the market will be ready to sell and to buy infinite orders, giving them an infinite liquidity.

The uses of these types of algorithms have several advantages against other methods such as Continuous Double Action, where in order to trade you need to wait until another trader accepts the transaction.

The AMM price function used by Policy Oracle (Symphony project market) is based on Hanson's work (Hanson, 2003) and is meant to simulate real life demand and supply, assuming at the same time that each contract has the same value at the start.

Once we have analysed the element that regulates the market we would like to introduce how it works.

The first step is to know how the algorithm establishes the prices.

Taking 's_i' as the amount of times that a given contract has been shared, the price of the contract will be:

Formula 1: Contract Price Value

$$p_i = \left(\frac{ce^{s_{i/b}}}{\sum_k e^{s_k}/b} \right)$$

In this formula 'b' represents the market's depth, controlling the variation of the price when a transaction is made on the market. When the value of 'b' is small, it will provoke big fluctuations on the price for each share, meanwhile when the value of 'b' is bigger, it will allow for more rigidity on prices and less volatility.

'C' represents the maximum price of an outcome, whereby in this market we are going to take a range between 0 and 100 for simplicity.

Once we have obtained the formula for the price, we can derive it and obtain the share cost of any amount of contracts. We can also obtain the price variation for each share, and then we can define this formula as the buy/sell transaction cost/profit.

Formula 2: Share cost

$$K = bclog(\left(\frac{p\left(e^{\partial/b}-1\right)}{c} \right) + 1$$

The participant will have to choose how many contracts they are going to sell or to buy, which will be represented by Q.

In this formula K will show the particapant's cash balance changes.

Now we have defined all the variables and how they are established. It is important to note that the constant b value is important for functionality of the future market. As mentioned, a small b value will provoke high variations in the price when a contract is shared, meanwhile if we have a high b value the price movements will be small and will not reflect the agreggated participants opinion.

In this project, ‘b’ will depend on the total amount of money (K) and the contract upper price, which is given if all the money on the market will be invested in this contract. The b value will be given by this formula, based on the work of (Berg & Proebsting, 2009).

Formula 3: “b” value

$$b = \frac{-K}{C log \frac{N\left(1 - \frac{P_{upper}}{C}\right)}{N-1}}$$

‘N’ will represent the possible mutual contracts in the market and ‘Pupper’ is fixed as 99.

With the objective of maintaining the market elasticity constant, the b value will be adjusted and re-calculated when a new user is registered on the platform, also when a question expires. This is because the total amount of money available in the market will change after each one of these cases.

Once we have explained how the b value is established, we have all the information needed for knowing how the algorithim is going to establish the prices and how they will change with each share of the contract. The process will be automatic with each change produced in the platform.

4.4 Project Design

Once the Spanish Political situation has been introduced we will proceed to explain the project design. The project will consist of 6 questions about the future of Spain, where those questions will work as future contracts to be shared between the platform users, in order to make predictions about the political future of Spain.

We will proceed to explain the market contracts which were released on the platform as well as the objectives followed by this one, and the expected results.

As we have said before the 3rd political election was just a possibility, then the first aim was to understand the question, “Is there going to be a 3rd elections in Spain before the end of 2016? “, with two possible answers “yes” or “no”.

As we do not know if there will be elections or not, further questions are placed in a future scenario where there are elections in 2016.

Furthermore, in a society where many people are fatigued by the uncertainty of political topics, this brings about the second question regarding participation, “In a future elections scenario, will the participation be more or less than the previous elections”? With again two possible answers “more” or “less”. We thought it would be interesting to find out about people’s opinion on the participation of future elections, as an indicator of people’s attitude towards politics.

Once we have finalised the questions about if there will be elections and if the participation will be lesser or greater than in the previous one, the next questions will be related with the results.

The first question, “Which political force is going to be the most voted” with the answers being “PP”, “PSOE”, “PODEMOS” and “CIUDADANOS”. This contract will be done as a control question and although we do not know the answer, the previous elections show us that PP has been the most voted for years. Then we wanted to test if people’s attitude towards voting for their chosen party is influenced by their desires or it is a logical answer based on facts.

“Is PP going to reach more than 50% of the votes in a future elections scenario” with the answer “yes” or “no”, was formulated in order to know if PP, the most voted party in the previous elections, can govern alone, without any agreements with the other political forces.

The next question was about government pacts and agreements, “In a future government scenario who will be involved in the government coalition”? Which can be answered as “PP+CIUDADANOS”, “PP+CIUDADANOS+PSOE”, “PSOE+PODEMOS”, and “PSOE+CIUDADANOS+PODEMOS”, then the answer to this question will try to predict the different agreements that each party have to do in order to govern.

Then to finish, the last question requires a longer explanation in order to understand the motives that we have to settle it.

First of all PSOE party was in a fragile situation, because historically they are the second Spanish Political Force combined with opposite ideas to PP. Most of the political analysers agreed that the future of Spain depends on PSOE’s decision. The decision consisted in an abstention, which will give PP the power to rule the country or a negative vote, which can be translated as the 3rd elections.

Then we wanted to see what people think about the results of PSOE, “Which vote percentage will PSOE obtain in a future elections scenario” with the answers “10%-17%”, “17%-20%” “20%-22%” and “22-25%”, based on June results

4.5 Requirements

With the questions formulated and with the support of Policy Oracle system, there was one more requisite that the project needed in order to start. We needed subjects who share future contracts in a market. That is probably always one of the more difficult requirements to satisfy, given that is not easy to find people who want to share their opinion whereby the only incentive is their personal satisfaction.

As we have mentioned before, this project has no monetary incentives on the accuracy of the answer, meaning that no money will be given to the participants, so when the future event occurs no one will obtain monetary recompense, even when the predictions realised in the future contract finally occurs.

It is clear that it is more difficult to find people who want to register on the platform and exchange future contracts when the payoff will be always 0, no matter if the prediction realised have occurred on the reality or not.

Clearly political and economic knowledge of each user will differ, depending on a lot of factors, such as information given, political knowledge or education of the subject, among many others.

However in a real event, which is a political election the range of the population is the same, there will be votes of all kind of people, with all kind of different information, which is why we wanted people of different ages, sexes and of different educational levels in order to make our predictions as accurate as possible.

We finally found 17 users who were disposed to share contracts and information about Spanish elections. A total of 17 people were the total amount of subjects that exchanged contracts in our Political Election market, exchanging their information and making their predictions about the future of Spain.

4.6 Market Start and Schedule

To start the market we had two principal requirements, contracts to share and people who share the contracts, as well as the approbation of Policy Oracle administrators.

All the requirements were satisfied by 18/10/2016, then a day after 19/10/2016 Spanish Markets started to work as a part of Policy Oracle market.

People had at this point 5 days to share their information and thoughts about the Political future of Spain, as on 23/10/2016 PSOE will have their federal committee in which they will decide if they let PP govern abstaining in the investiture, or opposing that they face the PP and make the 3rd elections of Spain a reality.

As soon as the subjects understood all the mechanisms, the market started working in an unstoppable way. All contracts were shared and regulated by the market mechanisms that we have previously explained. The results were satisfactory; given that the high participation that the market had whilst it was open. The fact that we find shares on our contracts reveals that not all the people have the same information or the same thoughts, hence in this case no transaction would have been produced and the market would not have produced any valid estimators.

5. Spanish Market Results

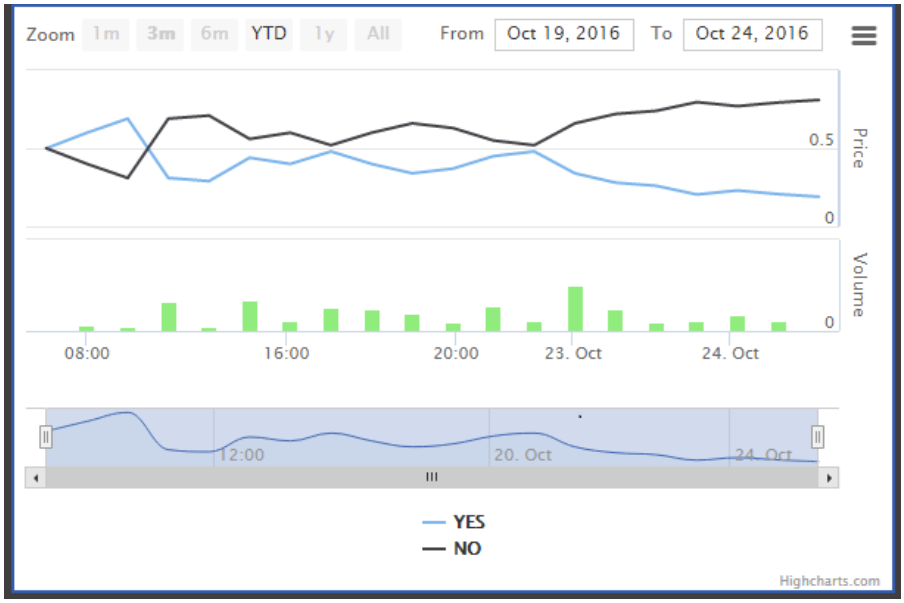
On 23/10/2016 the inner votes of PSOE dictated that they would abstain on the government investiture, meaning that there will not be 3rd elections in Spain. One day after, in agreement with Policy Oracle Administrators opinion, we decided to close the market and analyse the results.

The fact that the PSOE federal committee established the abstention, letting PP govern the country gave us the possibility to analyse the results of the following contract “Will there be a future election?”

From the results obtained from our market has, it can be concluded that 81,4% of the subjects concluded that there will be no 3rd elections in Spain. Furthermore, we are now aware that there will be no 3rd elections.

Expert opinions and market prediction evolved in the same way as that of the previous days to the federal committee.

Graph 5: Spanish Elections Project results, Question "Will there be a future elections?"



Source: http://spain2016.policyoracle.com/markets/579 based on subjects shares to the contract.

As we can see on graph 5, the possibilities of the 3rd elections were higher at the start of the market, but then this fact became less probable, reaching the lowest point in the previous hours to the committee meeting, where coinciding with all the experts the prediction market mechanism predicting a PSOE abstention and in consequence the fact that there will not be 3th elections on Spain in 2016.

The fact that there will be no third elections makes the rest of the questions impossible to compare with the real facts that will happen in Spain. However we can still compare the information given by the future market to make predictions about what would happen in the case of the 3rd elections, where predictions can be compared with polls and political expert's predictions.

Our principal sources on the prediction of Spain's 3rd elections will be metroscopia (Metroscopia, 2006) and Centro de Investigación Socioógico (CIS) (CIS, 2016) as they are two of the principal political predictor sources.

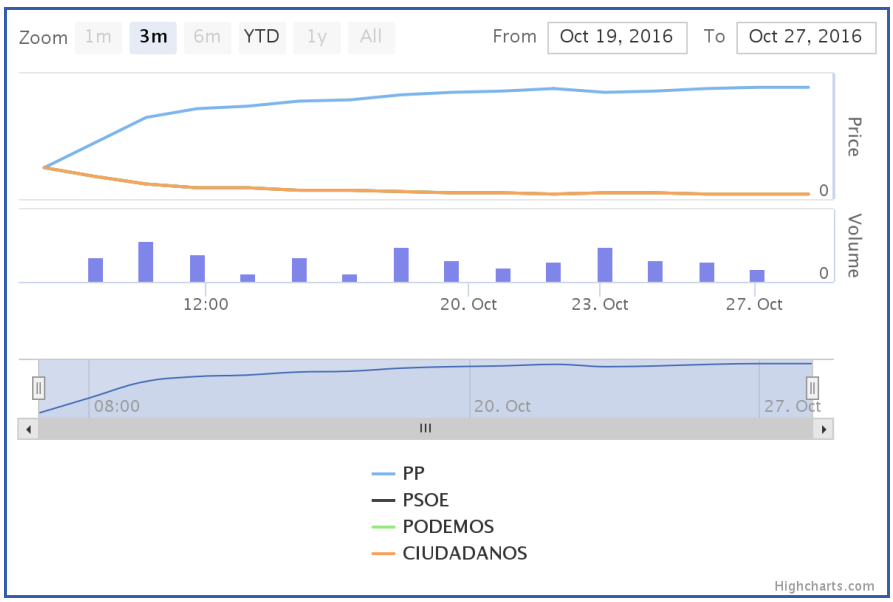
Following the next contract shared on the market, "In a future elections scenario will the participation be more or less than in the previous elections?"

The contract has given us the prediction that in that case there will be third elections with 87,56% of probability the participation will be lesser, as we can see on the graph 6.

Graph 6: Spanish Election Project Results, Question "In a future elections scenario will the participation be more or less than in the previous elections?"

Source: http://spain2016.policyoracle.com/markets/580 based on subjects shares to the contract.

Graph 7: Spanish Election Project Results, Question "which party is going to be the most voted in a future elections scenario?"



Source: http://spain2016.policyoracle.com/markets/581 based on subjects shares to the contract.

The information given by the contract coincide with the one extracted by metroscopia, with the last study they elaborated on being 9th of September. The predictions were that in a future elections scenario the abstention would be 37%, which is greater than the 30,16% produced in the June elections. In fact it will not only be less than the previous one, but also there will be less participation for democracy in Spain.

Furthermore we cannot compare the contract with official results, we can affirm that our predictions agree with the principal electoral predictions made, and we can classify the results as successful.

Following the order of questions, the next question is “which party is going to be the most voted in a future elections scenario?”

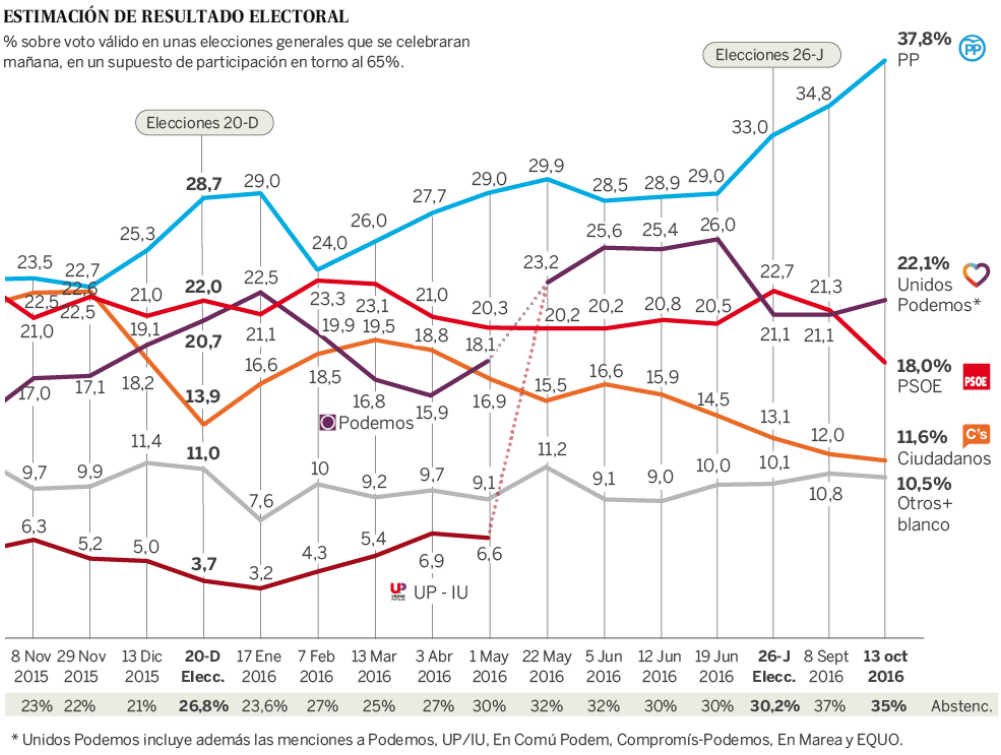
As we can see from our results on graph 7, our market is giving a probability of 88,6% to the PP to be the most voted party in the case of future 3rd elections. By observing the results of previous elections and the analyses’ made until today that answer is more than correct. In fact we could also say that the public general knowledge that PP will be the most voted party has made this question not valid to the market, which proves that the trading of a question, whose answer is well-known, is less by far than one where the answer is open. This is due to the fact that when everyone has the same information, Prediction Markets loose most of their use.

Following the order of contracts, the next question is “Is PP going to reach more than 50% of the votes in a future elections scenario?” with these results, shown on graph 8.

Graph 8: Spanish Election Project Results, Question "Is PP going to reach more than 50% of the votes in a future elections scenario?"

Source: http://spain2016.policyoracle.com/markets/582 based on subjects shares to the contract (Oracle, 2016).

Graph 9: Spanish Elections Metroscopia Predictions



Source: (Metroscopia, 2006)

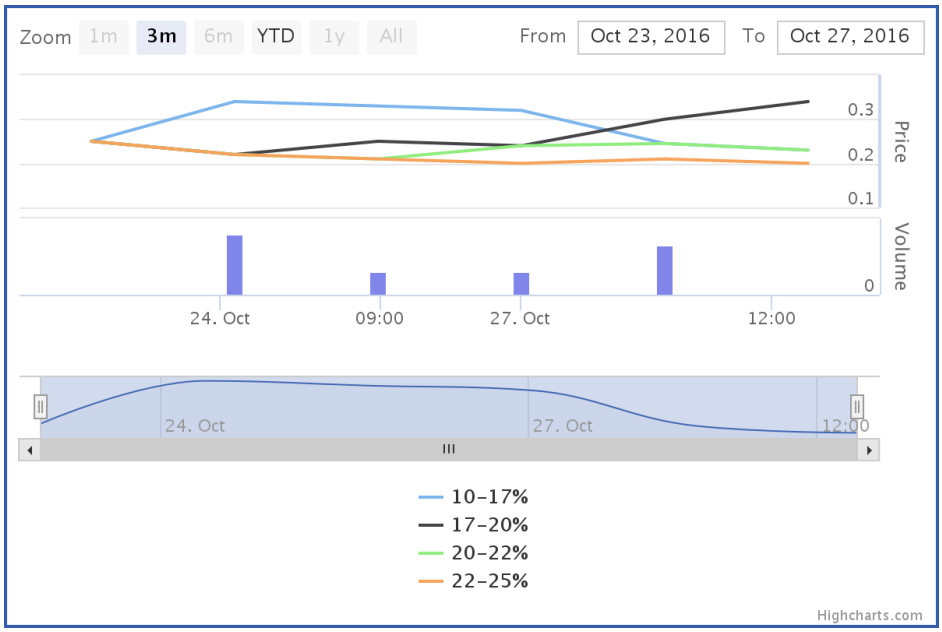
First of all we would like to say that this contract was posted not with the intention to know if PP will reach more than 50%, given that this sounds impossible looking the past elections results. The aim of this question was to know if the incapacity to make political agreements would drive the decisions of the population towards voting for PP, making the votes for PP the absolute majority.

The results, shown in graph 8, have indicated that there was a 58,24% probability that PP will not obtain an absolute majority. Even if the results predict that PP will not reach that amount of votes, this percentage is still surprising, as the last predictions gave a prediction of 34,8% of the votes, as we can see on the following table.

Then we can conclude that our predictors estimates were similar to the principal estimators, graph 9, where the difference between the predictions made could explain the changes on the vote intention, reminding the reader that in the past months the situation has been constantly changing.

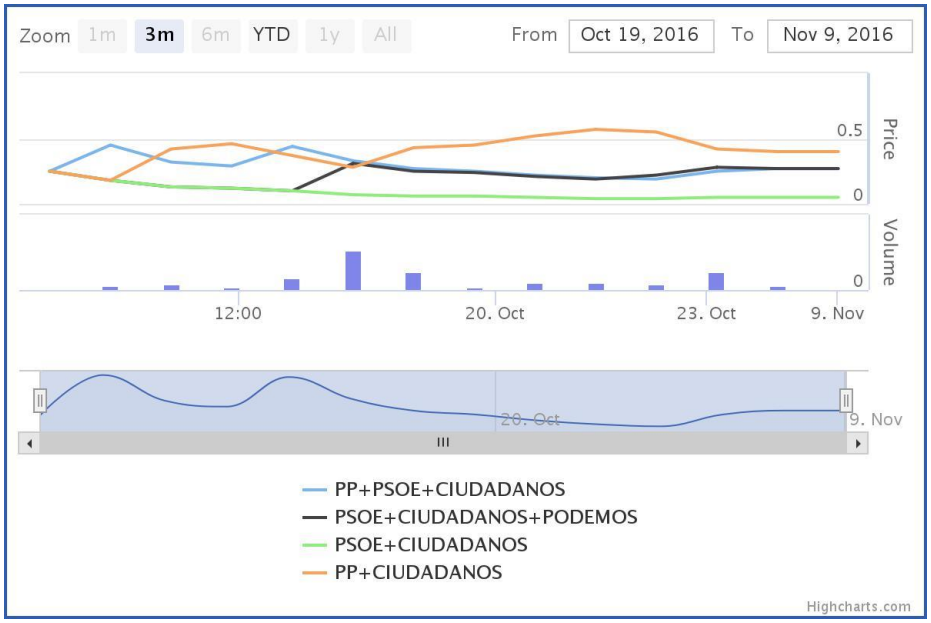
The next question was referred to the future vote intention of PSOE, and as we can see on the vote intention prediction made by metroscopia, graph 9, on October barometer, PSOE will obtain 18,0% of the votes, meanwhile our market has forecasted a range of votes between 17%-20%, with a 34,3% of probabilities, as we can see on the graph 10.

Graph 10: Spanish Election Project Results, Question "Which vote percentage will PSOE obtain on a new political elections scenario?"



Source: http://spain2016.policyoracle.com/markets/583 based on subjects shares to the contract.

Graph 11: Spanish Election Project Results, Question, "In a future elections escenario, which will be the govern coalition?"



Source: http://spain2016.policyoracle.com/markets/584 based on subjects shares to the contract.

The deviation could be also produced by the time distance amongst the two predictions, where metroscopia prediction was made on September, whilst our prediction finished right before the PSOE federal committee, which could have decreased the expectations and attitudes of the people.

Finally, our last question was "in a future election scenario, which parties would be involved in a coalition", this contract is the more difficult to compare with the official dates, as the 3rd elections were not carried out in the end. However our prediction markets have made predictions in the case of a 3rd election, as we can see on graph 11.

With a 34,3% probability of our market predicting that the future government will be formed by a coalition between PP and Ciudadanos. That contract could be considered the only one that is more dissimilar to the official predictions, and can be assumed as the most realistic. With the PSOE abstention PP will not need any other political coalition to govern, hence it seems clear then that they will not agree with any other party.

5.1 Spanish Election Prediction Market Results Analysis

Spanish Prediction Markets have given us satisfactory results for most of the questions posed and we will consider that our most accurate prediction has been that there is no celebration of 3rd elections in Spain, as our market predicted this with a probability of more than 80%.

We are also satisfied about the contract which gives us the prediction that the percentage of participation will be less than that of past elections. That result coincides with all the official polls and studies done after the 2nd elections, and it seems clear that if the 3rd elections had gone ahead, the participation would have not only been less than in the past elections but the lowest in Spanish democracy.

The fact that the 3rd elections did not happen, has meant that some questions could not be compared with real events limiting the conclusions obtained. On the other hand, we are also proud of the forecasts made by our system, which seems similar in most of the cases to the official polls. Our predictions seem to reflect the last moments of events better and how they change the probabilities. For example, on the future election contract. The nearer that the PSOE federal committee was and the louder that rumors says that they will abstain to a future investiture of PP the most shares that our contract received with the answer that there will be not future elections.

In conclusion we are satisfied with the market mechanism functionality and with the conclusions that they have brought about. We are also satisfied with the participation within the experiment and with the amount of contracts shared. It is obvious that we would have preferred a market with a greater number of participants, as a greater number of participants make the estimations less sensitive to random answers, which is always a possibility in a market that is ruled with play money.

It is also clear that if the 3rd elections did take place, this would have enabled us to analyse how changes on the information people have influences their decisions, including rumors that appear to be on the different media sites. However we were aware that there was a probability for this to not happen, and the forecast made by our market demonstrated that.

6. General Conclusions

To conclude, we are going to discuss our general conclusions based on three general aspects about future markets. First of all we discuss their recent importance, including our opinion about the applications that they can have or are already having, as well as discussing our project as Spanish Politics predictor.

Firstly, we understand the growth of prediction markets as a natural movement, due to all the research done to date. The recent improvements on market designs as well as market theory, have enables us to the discover the real capacity that prediction markets have as predictive tools.

The high accuracy shown by the experiments realised with prediction markets have permitted the incursion of them in all fields. It is not just the use of prediction market as an economic estimator that has had growth on the last decades, but their use of in non-profit fields have become equally as important as others.

The rising trends of using such markets highlights their true importance in the future, and it can be assumed that their uses will experiment a growth in the same direction.

Finally, by analysing our own experience with using such markets, we can consider it as partially satisfactory. We believe that the results obtained can be considered as real robust predictors of the Spanish political future, however we also think that the limitation of our market joint by the nonoccurrence of the 3rd elections in Spain have had a repercussion in our results.

We can consider that market mechanisms are sensitive to changes regarding public knowledge, whereby a small change of future information could provoke big changes in the predictions, and that is a mechanism that traditional methods do not reflect. It is clear that the changes on the prices of contracts are directly due to market mechanisms but most of all they are due to subject attitude and learning effect.

It is interesting to note, that knowledge appears to be key in prediction markets where we can identify a learning-behavior effect. The fact that one subject may have acquired more knowledge regarding the topic of the market, may mean that another subject with less knowledge may be heavily influenced by the decision of the first subject. Therefore it appears that subjects can be driven to make decisions based on an assumption that the subject with greater knowledge is more likely to make the 'most probable' decision.

That starts a mechanism that produce that the information that initially only was known by a small amount of users become of general knowledge on the market. Such mechanism could provoke that the information change completely the prices and of course the predictions made.

It is also true that, the fact that the market has no monetary compensation, makes users risk adversity grow and because of that, the accuracy of the market is reduced. In the same way, the fact that the 3rd elections in Spain were a possibility and not a consumed fact has had both positive and negatives effects. The uncertainty of the situation has raised concerns, highlighting the fact that information changes constantly and also driving greater activity within the market due to an increasing popularity in concern. On the other hand, the fact that there will not be 3rd elections has meant that the predictions made by some of our contracts will not be compared with real results.

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