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Meluzín T., Pietrzak M.B., Balcerzak A.P., Zinecker M., Doubravský K., Dohnal M.

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RUMOURS RELATED TO POLITICAL INSTABILITY AND THEIR IMPACT ON IPOs. THE USE OF QUALITATIVE MODELLING WITH INCOMPLETE KNOWLEDGE

Meluzín T., Pietrzak M.B., Balcerzak A.P., Zinecker M., Doubravský K., Dohnal M.*

Abstract: This paper deals with propagation of rumours linked to political instability within going public procedure. Rumours affect the decision making significantly because of information asymmetry. Firstly, a team of experts identified a set of 9 macroeconomic variables that are likely to be affected by political instability in a country. Next, a qualitative model was developed. The result is represented by 25 scenarios and their qualitative solutions. The transitional graph represents all possible transitions among the 108 scenarios. Although no of the rumours is under control of the investor, if timely detected, any damages can be averted.

Key words: macroeconomics; politics; rumours; going public; qualitative models; scenarios

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Introduction

In the epidemiology qualitative models have been developed to study the propagation of infectious diseases since the 1920s. Since the beginning of the 1960s the transmission of ideas as an "epidemic" process has being studied to analyse how rumours affect stock markets, marketing strategies and situations of enterprises (Goffman and Newill, 1964).

In current research, qualitative modelling is applied to study the impact of rumours related to political instability on initial public offerings (IPOs). Both traditional business media, and especially modern electronic communication tools are often a source of confounding announcements that are likely to affect decision making of market participants (Palmon et al., 2009). Therefore, when rumours on planned IPO are spread, some targeted communication campaigns should be introduced by going public companies in order to avoid an IPO failure. In this context the objective of the article is to propose an approach for dealing with propagation of rumours linked to political instability within going public procedure.

* **doc. Ing. Tomáš Meluzín, PhD**, **doc. Ing. Marek Zinecker, PhD**, **Ing. Karel Doubravský, PhD, prof. Ing. Mirko Dohnal, DrSc.,** Brno University of Technology, Faculty of Business and Management, **Michał B. Pietrzak, Ph.D.**, **Adam P. Balcerzak, Ph.D.**, Nicolaus Copernicus University, Faculty of Economic Sciences and Management
✉ Corresponding author: adam.balcerzak@umk.pl
✉ meluzint@fbm.vutbr.cz; michal.pietrzak@umk.pl; zinecker@fbm.vutbr.cz; doubravsky@fbm.vutbr.cz; dohnal@fbm.vut.cz

Research Background and Theoretical Importance of the Problem

The European financial system is traditionally focused on banking loans. However, one can see a growing role of the stock markets and IPO in obtaining financing for enterprises (Lizińska and Czapiewski, 2016; Boldeanu and Tache, 2016; Meluzín and Zinecker, 2016; Hes and Jílková, 2016; Mačí and Valentová, 2017; Bonaventura and Giudici, 2017). This process has been accelerated by the globalisation influencing both financial markets and leading to growing competition in real sphere (Vukovic et al. 2016; Balcerzak and Pietrzak, 2016, 2017; Balcerzak, 2016; Heryan and Ziegelbauer, 2016; Zinecker et al., 2016; Fałdziński et al., 2016; Pohulak-Żołędowska, 2016; Pietrzak et al., 2017b; Masood et al., 2017; Monni et al., 2017). Possibilities of going public are becoming more popular for smaller companies and start to be considered as an important factor influencing entrepreneurial environment (Pietrzak and Balcerzak, 2016; Ivanová 2017; Pietrzak et al., 2017a; Kruk and Waśniewska, 2017).

Recent academic literature has analysed the effects of economic and political uncertainty on financial markets and firms´ economic results from various perspectives (Francis and Ofori, 2015). For example, it is well known that macroeconomic and political uncertainty and reputation of the company matters when investment is, at least partially, perceived as irreversible. A number of authors deliver evidence on this issue.

Pástor and Veronesi (2011) were focused on the issue how changes in government policy affect stock prices. The authors conclude that stock prices fall dramatically if a large uncertainty about forthcoming government policy exists. Therefore, policy has unambiguous impact on increase of volatility, risk premia and correlations among stocks. Rodrik (1991) developed a model to link policy uncertainty to the investment activity of private investors. He shows that even "moderate amounts" of policy uncertainty can affect a negative response, and that otherwise reasonable reforms might cause damages if they are not performed by trusted politicians. Brandon and Youngsuk (2012) deliver evidence that political uncertainty significantly affects real economic outcomes of a country. Hermes and Lensink (2001) studied the determinants of capital flight from LDCs. Their empirical research deals with the relationship between the uncertainty of government policies and capital flight. The authors conclude that private investors will continue to hold their wealth abroad as long as the impact of local government policies on the real value of wealth remain unclear and otherwise real returns on foreign assets are „clear and certain". Erb et al. (1996) explored whether a link between different measures of country risk and future expected stock returns exists. Empirical findings suggest a correlation between the country risk measures and future returns of equity. However, financial risk measures are most important from the perspective of future equity returns. Ben-Nasr et al. (2012) investigated the political determinants of the cost of equity using a unique data set of 236 firms privatized between 1987 and 2006 in 38 countries. The main finding of this study is that the cost of equity is increasing in government-owned companies. The

authors also deliver evidence that the cost of equity is significantly related to political orientation and the extent of government expropriation.

As reported by Blajer-Gołębiewska and Kos (2016) there is an agreement in the academic literature that reputation of a company affects investors´ decisions. Therefore, the reputation of a company is "a strategic asset and is said to have an ability to create wealth".

Investors receive information about territories, industries and firms going public through various channels such as institutional rating agencies, business magazines, prospectus, or high-tech information intermediaries. An informational asymmetry exists determining the price at which the share of going public companies can be sold, i. e. the magnitude of the underpricing (Pagano et al., 1998). Supriya and Phani (2016) reviews recent academic studies to identify factors influencing the price discovery mechanism of IPO. In spite of the best efforts of issuing companies and their underwriters, an IPO is always "subject to greater risk since certain class of investors may perceive lack of sufficient information".

The scarcity of information for young and small firms may put forward financial analysts´ and columnists´ recommendations. Therefore, both columnists and financial analysts represent very often a source of the "intellectual epidemic" (Palmon et al., 2009), which is highly influential in decision making of uninformed investors.

Goffmann and Newill (1964) characterized the "epidemic" process as "transition from one state (susceptible) to another (infective) where the transition is caused by exposure to some phenomenon (infectious material)". The transmission of ideas is analogous to the transmission of ideas; "once an individual is infected with an idea he may in turn, after some period of time, transmit it to others".

The ideas on IPOs are very often transmitted in the form of confounding announcements or rumours. Rumours are an important form of social communications and their spreading plays a significant role in influencing the public opinion (Galam, 2003). Rumours might adversely affect the functioning of financial markets when causing a panic (Kimmel, 2004; Kosfeld, 2005). The information content of rumours can range from a simple gossip to advanced propaganda and marketing material. Rumours like mechanisms form the basis for the phenomena of viral marketing, where companies exploit social networks on the Internet. Rumours can be viewed as an infection of the mind, and their spreading shows an interesting resemblance to that of epidemics (Nekovee et al., 2007).

Methodology

Our approach that models spreading of rumours in the context of IPOs is of a qualitative nature, which means that shallow knowledge on rumours spreading is available only as a verbal description based on trends: decreasing, constant, increasing. There are no quantifiers, numbers, and fuzzy/rough sets (Dohnal, 1992).

Trend based models (TB) are based on application of different types of equationless heuristics (EHE). They differ according the derivative orders. The algorithms are based just on using second order derivatives. There is an example of the first order EHE (for details see Lindgren and Bandhold, 2003):

If HCQ is increasing then MCD is increasing.
If HCQ is decreasing then MCD is decreasing. (1)

where:
MCD - *marginal cost of debt* and HCQ - *home country institutional quality*.

It follows an example of the second order EHE:

If HCQ is increasing then MCD is increasing more and more rapidly.
If HCQ is decreasing then MCD is decreasing more and more rapidly. (2)

Information intensity of conventional statistical methodological tools creates pressure on artificial intelligence experts to develop new methods (Russell, 2009), which require not such amount of information as statistics. However, they should consider such information items as EHEs (Vicha and Dohnal, 2008). The following trend based (TB) methods are based just on four TB values:

Positive	Zero	Negative	Any Value
+	0	–	*

(3)

Many shallow knowledge items can be described only in a verbal way while using trends, *decreasing*, *constant*, *increasing* (Yan et al., 2013).
The scenario based analysis is a popular approach (Bohensky et al., 2011). It represents a mixture of qualitative and quantitative features and enables to distinguish scenarios, forecasts and visions (Derbyshire and Wright, 2017; Lindgren and Bandhold, 2003):

Scenarios	*Forecasts*	*Visions*
Possible, plausible futures	Probable futures	Desired future
Qualitative or Quantitative	Usually qualitative	Quantitative

McDowall (2014) reports an intuitive definition of qualitative transition scenarios. It is highly probable that predictive scenario approaches result in policies that perform poorly under severe information shortages (IS). It is unavoidable to combine an adaptive policy-making framework and a computer based methodology to create and examine sets of scenarios.
There is set of variables defined:

$$X_1, X_2, \ldots, X_n \tag{4}$$

A sequence of *TB* triplets is used to describe a set of *m* TB *n*-dimensional scenarios (Vicha and Dohnal, 2008):

$$\left[\left(X_1, DX_1, DDX_1\right), \left(X_2, DX_2, DDX_2\right), \ldots, \left(X_n, DX_n, DDX_n\right)\right]_j , \tag{5}$$

where
$j = 1, 2, \ldots, m$. DX_i is the first and DDX_i is the second time *TB* derivatives.

In this paper a *TB* shallow model is under study, which can be described by a set of *w* pair wise relations:

$$P_v\left(X_i, X_j\right),\ v = 1,2,\ldots,w\,. \tag{6}$$

The set of relations has to be solved to assess all scenarios. For instance, the following set of relations is under study:

	Shape	X	Y
1	22 (see **Błąd! Nie można odnaleźć źródła odwołania.**)	X_1	X_2
2	26 (see **Błąd! Nie można odnaleźć źródła odwołania.**)	X_3	X_2

(7)

A solution of qualitative models is of a combinatorial nature and we do not study it here; for descriptions see (Vicha and Dohnal, 2008). The solution of the model (7) has 13 scenarios:

	X_1	X_2	X_3
1	+ + +	+ + +	+ – –
2	+ + 0	+ + 0	+ – –
3	+ + –	+ + –	+ – +
4	+ + –	+ + –	+ – 0
5	+ + –	+ + –	+ – –
6	+ 0 +	+ 0 +	+ 0 –
7	+ 0 0	+ 0 0	+ 0 0
8	+ 0 –	+ 0 –	+ 0 +
9	+ – +	+ – +	+ + –
10	+ – 0	+ – 0	+ + –
11	+ – –	+ – –	+ + +
12	+ – –	+ – –	+ + 0
13	+ – –	+ – –	+ + –

(8)

We can interpret the results (8) as follows: E. g., the triplet (+ + +) describing the time behavior of the variable X_1 of the first scenario shows that X_1 is in positive values; DX_1 is positive; DDX_1 is positive, see (5). The interpretation is that the variable X_1 is increasing more and more rapidly.

Any additional relation or equation is of restrictive nature. It means that the volume of scenarios *m* (2) will be reduced or stay constant if a model enlargement is done. The following qualitative equation is involved into the model (7):

$$X_1 + X_2 = X_3 \tag{9}$$

The next set of scenarios represents a solution:

	X_1	X_2	X_3	
1	+ + +	+ + +	+ – –	1
2	+ + –	+ + –	+ – +	3
3	+ + –	+ + –	+ – 0	4
4	+ + –	+ + –	+ – –	5
5	+ 0 +	+ 0 +	+ 0 –	6
6	+ 0 0	+ 0 0	+ 0 0	7
7	+ 0 –	+ 0 –	+ 0 +	8
8	+ – +	+ – +	+ + –	9
9	+ – –	+ – –	+ + +	11
10	+ – –	+ – –	+ + 0	12
11	+ – –	+ – –	+ + –	13

(10)

The right column identifies the corresponding scenario of the model (7). It is obvious that the scenarios Nos. 2 and 10 were excluded.

Table 1 reports a comprehensive set of all possible one-dimensional transitions.

Table 1. A list of all one dimensional transition

	From	To	Or	Or	Or	Or	Or	Or
1	+ + +	+ + 0						
2	+ + 0	+ + +	+ + –					
3	+ + –	+ + 0	+ 0 –	+ 0 0				
4	+ 0 +	+ + +						
5	+ 0 0	+ + +	+ – –					
6	+ 0 –	+ – –						
7	+ – +	+ – 0	+ 0 +	+ 0 0	0 – +	0 0 +	0 0 0	0 – 0
8	+ – 0	+ – +	+ – –	0 – 0				
9	+– –	+ – 0	0 – –	0 – 0				
10	0 + +	+ + 0	+ + –	+ + +				
11	0 + 0	+ + 0	+ + –	+ + +				
12	0 + –	+ + –						
13	0 0 +	+ + +						
14	0 0 0	+ + +	– – –					
15	0 0 –	– – –						
16	0 – +	– – +						
17	0 – 0	– – 0	– – +	– – –				
18	0 – –	– – 0	– – +	– – –				
19	– + +	– + 0	0 + +	0 + 0				
20	– + 0	– + –	– + +	0 + 0				
21	– + –	– + 0	– 0 –	– 0 0	0 + –	0 0 –	0 0 0	0 + 0
22	– 0 +	– + +						
23	– 0 0	– + +	– – –					
24	– 0 –	– – –						
25	– – +	– – 0	– 0 +	– 0 0				
26	– – 0	– – –	– – +					
27	– – –	– – 0						

As an example, the third line in Table 1 shows that it is possible to move the triplet (+ + –) into the triplet (+ 0 –). There are two more possible transitions. The Figure 1 shows a TB description of an oscillation using the one-dimensional triplets $n = 1$ (5). There is a correspondence between the time sequence of the one-dimensional transitions in Figure 1 and the Table 1.

Solutions reported in Table 1 can be modified on ad hoc basis. The transitions must, however, satisfy a common sense reasoning of the user. A transitional graph ***G*** is an oriented graph. Its nodes are the set of scenarios ***S*** and oriented arcs are the transitions **T**:

$$G(\mathbf{S},\mathbf{T}). \tag{10}$$

The set of *n*-dimensional transitions ***T*** can be created by the corresponding set of scenarios ***S***. The one-dimensional transitions (see Table 1) have to be used. Table 1

defines requirements satisfying all *n* one-dimensional transitions. A path *P* is defined as an oriented sequence of scenarios. There can be loops in the graph *G* (10); thus, a path *P* can pass through the loop infinitely many times.

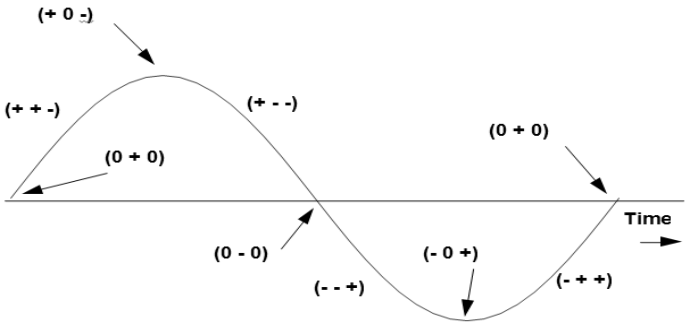

Figure 1. TB one dimensional time record

Empirical Results: A Case Study Analysis

Here, we apply the qualitative methodological approach within a case study in order to investigate the impact of rumors on the success of IPO. An IPO is successful if a sufficient demand for shares has been drum up, which results in the sale of issued shares at the highest price while also providing investors with opportunities to cash earnings in the long-term. We consider rumours in regard to political instability in country *"A"* making investors (financial markets) nervous. There are two confounding announcements (*A1* and *A2*):

A1: *The last government left office and the new government sent signals during the pre-election political campaigns that there might be some serious changes in the economic policies.*

A1: *A leading international business magazine reveals information that the designate political leader of the country is suspected of crimes involving fraud, breach of trust and bribes in several corruption cases. The scandal might be far more widespread than earlier believed.*

Both announcements have been repeatedly published by columnists in leading international business magazines and reveal information which are new for the public and are likely to affect negatively the sale of newly issued shares within the IPO procedure. As reported by Seymour-Ure (2003) rumours traditionally play a significant role in forming public judgment on "a leader´s reputation, performance, competence, and personality". We assume that the wide public of investors is going to be reached by rumours affecting significantly the market for loanable funds, net capital outflow, real exchange rate and the price of assets in country *"A"*.

We use the model of an open economy as described by Mankiw (2014) to explain how rumours about political instability might alter the economy´s equilibrium, price of assets and IPO activity. Firstly, a part of investors are sensitive to rumours

and decide to sell some of their assets in country *"A"*. The proceeds are used to buy foreign assets resulting in an increase in net capital outflow (*NCO*) in country *"A"*. Second, an increase in the *NCO* results in a greater demand for loanable funds (*DLF*) in country *"A"* to cover the increased demand for foreign assets. This drives up the real interest rate (*r*) in country. Third, because more and more investors supply bigger amounts of domestic currency of country *"A"* in the market for foreign currency exchange, the exchange rate (*E*) of domestic currency depreciates. These price changes that results from rumours about political instability influence some other key macroeconomic indicators. Currency depreciation pushes the trade balance (*TB*) toward surplus (cheaper exports, more expensive imports). Next, a higher interest rate reduces domestic real investment (*RI*) in case of both private and public investors, because future income is discounted more heavily and it is not worthwhile to sacrifice current resources (Jovanovic and Rousseau, 2004). An increase in prevailing interest rates influences the securities market in country *"A"*. The substantial academic literature (Mankiw, 2014) reports that an inverse relationship between interest rates and bond prices (*BP*) exists; thus if the interest rates moves upwards the bonds´ prices moves downwards. Many companies operating in the real economy also experience declines in their stock prices (*SP*) as higher interest rates mean lower consumption and thus earnings (financial industry might experience an opposite trend). Moreover, when the bank loans are more expensive, companies might not borrow as much and spend less on investment projects, which can slow down the growth of companies. There are also less companies going public in country "A". An IPO firm faces in a greater extend the phenomenon of informational asymmetry determining the price at which the share of going public companies can be sold. In the combination with higher interest rates the magnitude of the underpricing (UP) is more pronounced. Hence, country *"A"* is experiencing lower IPO volumes because both investors and prospective issuers have a greater incentive to wait for "the window of opportunity". A set of the following variables was identified (see Table 3) to study how political instability might affect IPOs.

Table 2. Set of Variables Affecting Negatively IPO Activity

Explanatory Variables	*Abbreviation*	Trend
% Net Capital Outflow	***NCO***	increasing
% Demand for Loanable Funds	***DLF***	increasing
% Real Interest Rate	***r***	increasing
% Exchange Rate Depreciation	***E***	increasing
% Trade Balance Surplus	***TB***	increasing
% Domestic Real Investment	***RI***	decreasing
% Bond Prices	***BP***	decreasing
% Stock Prices	***SP***	decreasing
% Underpricing	***UP***	increasing

The question to be addressed within this case study is as follows: "How to estimate that a particular scenario will occur?" This can be determined based on the knowledge reflected by a qualitative model. Subsequently, we defined interrelations among variables defined in Table 2. In Table 3 pairwise relations are displayed. The second column indicates the number of the corresponding qualitative shapes, see Figure 1. There is a set of 8 pairwise relations.

Table 3. Qualitative Model Represented by a Set of Pair-Wise Relations

Statement No.	Shape	X	Y
1	22	NCO	DFL
2	22	NCO	r
3	22	NCO	E
4	22	NCO	TB
5	24	NCO	RI
6	24	NCO	BP
7	M_+	NCO	SP
8	M_+	NCO	UP

Note: See Fig. 1 for the respective shapes, such as "22", "24", etc. M_+ represents positive proportionality

Table 4. Scenarios

Scenario	NCO	DLF	r	E	TB	RI	BP	SP	UP
1	+++	+++	+++	+++	+++	+-+	+-+	+++	+++
2	+++	+++	+++	+++	+++	+-+	+-0	+++	+++
3	+++	+++	+++	+++	+++	+-+	+--	+++	+++
4	+++	+++	+++	+++	+++	+-0	+-+	+++	+++
5	+++	+++	+++	+++	+++	+-0	+-0	+++	+++
6	+++	+++	+++	+++	+++	+-0	+--	+++	+++
7	+++	+++	+++	+++	+++	+--	+-+	+++	+++
8	+++	+++	+++	+++	+++	+--	+-0	+++	+++
9	+++	+++	+++	+++	+++	+--	+--	+++	+++
10	++0	++0	++0	++0	++0	+-+	+-+	++0	++0
11	++-	++-	++-	++-	++-	+-+	+-+	++-	++-
12	+0+	+0+	+0+	+0+	+0+	+0-	+0-	+0+	+0+
13	+00	+00	+00	+00	+00	+00	+00	+00	+00
14	+0-	+0-	+0-	+0-	+0-	+0+	+0+	+0-	+0-
15	+-+	+-+	+-+	+-+	+-+	+++	+++	+-+	+-+
16	+-+	+-+	+-+	+-+	+-+	+++	++0	+-+	+-+
17	+-+	+-+	+-+	+-+	+-+	+++	++-	+-+	+-+
18	+-+	+-+	+-+	+-+	+-+	++0	+++	+-+	+-+
19	+-+	+-+	+-+	+-+	+-+	++0	++0	+-+	+-+
20	+-+	+-+	+-+	+-+	+-+	++0	++-	+-+	+-+
21	+-+	+-+	+-+	+-+	+-+	++-	+++	+-+	+-+
22	+-+	+-+	+-+	+-+	+-+	++-	++0	+-+	+-+
23	+-+	+-+	+-+	+-+	+-+	++-	++-	+-+	+-+

24	+-0	+-0	+-0	+-0	+-0	+++	+++	+-0	+-0
25	+--	+--	+--	+--	+--	+++	+++	+--	+--

The following set of 25 scenarios exists, see Table 4, if the qualitative model (Table 3) is used to generate them and all variables are positive, it means that all triplets have the following general form (+, evaluate, evaluate). It is relatively easy to generate the list of all possible transitions among 25 scenarios, see Table 4, using Table 1. There are 108 transitions, see Table 5 and Figure 2.
Table 5 shows first 39 transitions out of all 108 possible transitions. For example first row 1 2 1 means that there is the transition from scenario No.1 to scenario No. 2 and one variable, BP (+-+)→(+-0), is changed, see Table 4. The Figure 2 gives all possible oriented paths. Any path is a qualitative description of a forecast. It means that the transitional graph *G* represents all possible future behaviours. The future behaviour is represented by a sub-graph *SG* of the transitional graph in Figure 3, see e.g. Figure 4, Figure 5 and Figure 6. Any forecast is a result of decisions done by a decision maker.

Table 5. First 39 transitions out of 108 transitions

Błąd! Nie można odnaleźć	**see** Błąd! Nie można odnaleźć	Błąd! Nie można odnaleźć	Błąd! Nie można odnaleźć	**see** Błąd! Nie można odnaleźć	Błąd! Nie można odnaleźć	Błąd! Nie można odnaleźć	**see** Błąd! Nie można odnaleźć	Błąd! Nie można odnaleźć
1	2	1	4	1	1	5	9	2
1	4	1	4	2	2	5	10	9
1	5	2	4	5	1	6	2	2
1	10	7	4	7	1	6	3	1
2	1	1	4	8	2	6	5	1
2	3	1	4	10	8	6	8	2
2	4	2	5	1	2	6	9	1
2	5	1	5	2	1	7	4	1
2	6	2	5	3	2	7	5	2
2	10	8	5	4	1	7	8	1
3	2	1	5	6	1	8	4	2
3	5	2	5	7	2	8	5	1
3	6	1	5	8	1	8	6	2

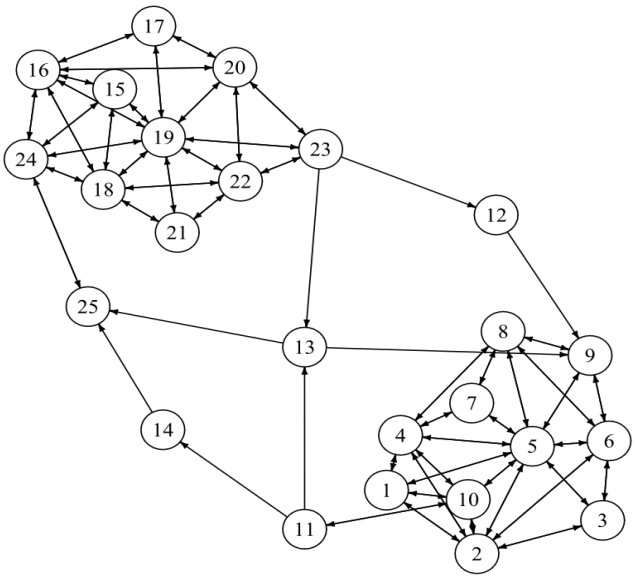

Figure 3. Transitional graph G

Let us suppose that the current situation under study corresponds to the scenario No. 1, see Figure 3, and that the following sub-graph, see Figure 4, is relevant to a decision maker. It means that the graph SG_1 is chosen by the decision maker and reflects their interests (required number of changed variables is 1, see Table 5 and Figure 3).

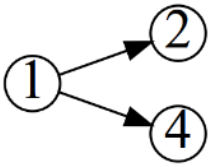

Figure 4. Sub-graph SG_1 of transitional graph G

There are two terminal nodes $n_t = 2$, see Figure 4. The first node is the node No. 2, the second one is the node No. 4. The probability of terminal nodes can be estimated using the graph SG_1 as follows from Table 6.

Table 6. Estimate of probability of nodes Nos. 2 and 4 for SG_1

Terminal node no.	Frequency f of terminal node	Estimate of probability f / n_t
2	1	½ = 0.5
4	1	½ = 0.5

Let us suppose that the current situation under study corresponds to the scenario No. 1, see Figure 3, and that the following sub-graph, see Figure 5, is relevant to a decision maker. It means that the graph SG_2 is chosen by the decision maker and

reflects his interests (required number of changed variables is 2, see Table 5 and Figure 3).

Table 7. Estimate of probability of nodes nos. 1, 3, 5 and 7 for SG_2

Terminal node no.	Frequency f of terminal node	Estimate of probability f / n_t
1	2	2 / 7 = 0.286
3	1	1 / 7 = 0.143
5	3	3 / 7 = 0.428
7	1	1 / 7 = 0.143

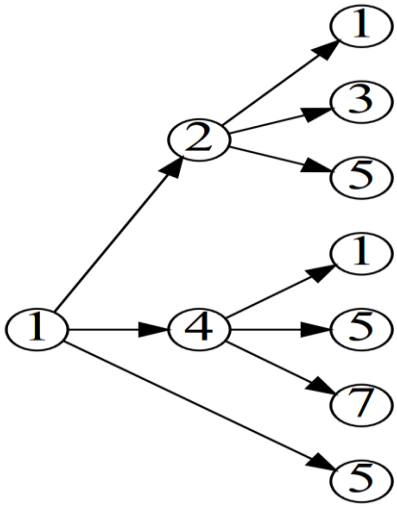

Figure 5. Sub-graph SG_2 of transitional graph G

There are seven terminal nodes $n_t = 7$, see Figure 5. The terminal nodes are nodes nos. 1, 3, 5 and 7, see Figure 5. The probability of terminal nodes can be estimated using the graph SG_2 as follows from Table 7.

Table 8. Estimate of probability of nodes nos. 2, 4, 6 and 8 for SG_3

Terminal node no.	Frequency f of terminal node	Estimate of probability f / n_t
2	7	7 / 24 = 0.292
4	7	7 / 24 = 0.292
6	5	5 / 24 = 0.208
8	5	5 / 24 = 0.208

Let us suppose that the current situation under study corresponds to the scenario No. 1, see Figure 3, and that the following sub-graph, see Figure 6, is relevant to a decision maker. It means that the graph SG_3 is chosen by the decision maker and reflects his interests (required number of changed variables is 3, see Table 6 and Figure 3).

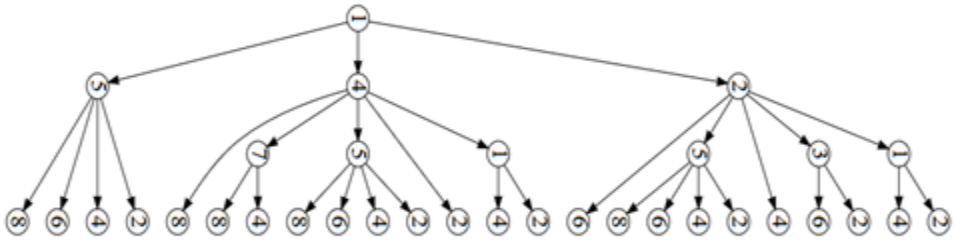

Figure 6. Sub-graph SG_3 of transitional graph G

There are twenty-four terminal nodes $n_t = 24$, see Figure 6. The terminal nodes are nodes nos. 2, 4, 6 and 8. The probability of terminal nodes can be estimated using the graph SG_3 as follows from Table 8.

Conclusions

In this paper we intended to develop a qualitative on trends based model analysing the impact of rumours linked to political instability on IPO activities. This model supports investors considering investments in any kind of assets if confounding announcements are spread and thus possible scenarios of the following developments have to be studied. There are two rumours included into our case study and we suppose that both of them are lotteries, i.e. no of them can be under control of decision makers.

According to the principle of consistency, the initial set of all scenarios (27^9 in our case study) was reduced to just 25 scenarios. A transition graph was developed and a reconciliation algorithm was used to achieve better results based on qualitative heuristic and isolated quantitative information. The transition graph shows 108 transitions among 25 scenarios. Any path is a qualitative description of a forecast and the transitional graph G represents all possible developments of external environment. The advantage of the applied qualitative approach consists in the fact that no variant of future development can be overlooked, i.e. the model covers all possible changes of the situation in time. Thus, the investors considering IPOs are not just passive observers. If a qualitative model exists, the decision makers may predict the development of defined variables in time. Next, targeted actions can be taken to reduce concerns in relation to a failure of the investment such as IPOs. E. g. additional resources of information might be drawn to re-evaluate influence of external environment on success of IPOs. Hence, we believe that TB analysis can be an effective tool for threats and opportunities analysis while assessing any investment.

The main advantage of a TB analysis is that no statistical data sets are required. Therefore, the set of TB scenarios/solutions is likely to be complete. It means that a decision maker or forecaster has the opportunity to study a complete set of variants. No reasonable variant can be overlooked if the analysis is based on a feasible TB model.

In a follow-up research we aim to concentrate on the involvement of additional variables into our case study. Not only lotteries, but also variables under control of decision makers are going to be reflected.

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PLOTKI ZWIĄZANE Z NIESTABILNOŚCIĄ POLITYCZNĄ I ICH WPŁYW NA PIERWSZĄ OFERTĘ PUBLICZNĄ. WYKORZYSTANIE MODELOWANIA JAKOŚCIOWEGO Z NIEPEŁNĄ WIEDZĄ

Streszczenie: Niniejszy artykuł dotyczy propagowania plotek związanych z niestabilnością polityczną w ramach procedury oferty publicznej. Pogłoski wpływają znacząco na podejmowanie decyzji z powodu asymetrii informacyjnej. Po pierwsze, zespół ekspertów zidentyfikował zestaw 9 zmiennych makroekonomicznych, na które prawdopodobnie wpłynie niestabilność polityczna w danym kraju. Następnie opracowano model jakościowy. Wynik jest reprezentowany przez 25 scenariuszy i ich jakościowe rozwiązania. Przejściowy wykres przedstawia wszystkie możliwe przejścia pomiędzy 108 scenariuszami. Chociaż żadna z plotek nie znajduje się pod kontrolą inwestora, jeśli zostanie wykryta w odpowiednim czasie, wszelkie szkody mogą zostać ograniczone.
Słowa kluczowe: makroekonomia, polityka, plotki, upublicznianie, modele jakościowe, scenariusze.

有关政治不稳定的流言及其对首次公开招股的影响。使用定性建模与不完整的知识

摘要:本文涉及在公开程序中传播与政治不稳定有关的谣言。由于信息不对称，谣言影响决策。首先，一个专家小组确定了一套可能受到一个国家政治不稳定影响的9个宏观经济变量。接下来，开发了一个定性模型。结果由25个场景及其定性解决方案表示。过渡图代表了108个场景中所有可能的转换。虽然没有任何谣言在投资者的控制之，如果及时发现，任何损害都可以避免。
关键词:宏观经济学; 政治;传闻; 上市 定性模型;场景。