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European Journal of Political Economy

journal homepage: www.elsevier.com/locate/ejpe

Politically induced uncertainty and asset-market valuation

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ARTICLE INFO

JEL classification:

D72

H25

L72

P26

Keywords:

Tax announcement

Stocks

Mining industry

Poland

ABSTRACT

We study the consequences of politically induced asset-market uncertainty. Our data are from Poland, where the imposition of a new resource tax was vaguely announced in a single sentence by the prime minister in November 2011. The tax concerned a single company, one of the world's leading copper and silver producers. We show how the announcement, besides imposing losses as expected on shareholders, introduced uncertainty into asset-market valuation.

1. Introduction

Uncertainty about fiscal, regulatory and monetary policies affects the real economy and financial markets (Bloom, 2014). Particular attention has been paid to the role of uncertainty about government policy in driving stock market reactions (Pastor and Veronesi, 2012, 2013; Baker et al., 2016; Kelly et al., 2016). The existing studies, however, have not quantified effects and have not separated policy-related uncertainty from sources of different ambiguities stemming from macroeconomic events (Pastor and Veronesi, 2013; Jens, 2017). In addition, while in many instances new information about economic policies may reduce uncertainty (which is often assumed, for example, with respect to the news about monetary policy), this should not be taken for granted (Baker et al., 2021). We show how new information, if very imprecise, can significantly accentuate uncertainty.

We document stock price moves in response to vague political pronouncements about a resource tax. Such a tax is on natural-resource rents (Daniel et al., 2010). We can study stock market valuation in response to the announcement of the tax because it was clear that the tax would only affect one company. This allowed us to analyze the company's stock price moves in response to the vague political statement. Our case study is from Poland, where a new tax proposal was announced without precision by the prime minister in November 2011. While the announcement lacked details, it was clear that the tax would only apply to KGHM Polska Miedź S.A., one of the world's largest copper and silver producers. The policy pronouncement increased uncertainty about KGHM profits and also as expected reduced the share price. The change in the share price was not a one-off response as economic theory would predict if there were full information. The decline for the first full day of trading was about 20%, and then about 30% after ten trading days.

We expect that the burden of a tax will be borne by the owners of firms at the time of announcement (Harberger, 1962; Hillman, 2019). The price of a company's stock should reflect investors' expectations about future net-of-tax earnings. Additionally, the presence of firm-specific uncertainty may lead risk-averse investors to diversify their portfolio to other assets, which can result in further declines in a company's stock prices.

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Received 31 October 2022; Received in revised form 26 April 2023; Accepted 20 June 2023

Available online 21 June 2023

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That being said, the case we investigate is particularly interesting because, in his address to Parliament, the prime minister did not provide details about the tax (when it would be implemented, in what amount). The announcement was not preceded by pre-legislative scrutiny. One vague sentence that addressed the issue introduced uncertainty into asset-market valuation. This allows us to bring evidence to bear on the question of how vague statements affect stock markets and the accuracy of the predictions embodied in the market price due to the eventual tax that was levied. Our case study provides a unique opportunity to analyze financial consequences of political statements that are mentioned as if in passing, without detailed information that the market would typically need to carry out an adjusted valuation of assets. Furthermore, and equally interesting, while the market reaction was immediate, it was stretched over time. The market underreacted and the decrease in valuation continued for several days. This supports the proposal that policy-related uncertainty cannot only readily translate into a decline in stock prices (Pastor and Veronesi, 2013), but also that declines can be spread over time as the process of clarifying uncertainty takes place.

Our analysis offers a unique opportunity to take a detailed view that has not been commonly adopted elsewhere. First, we can check the reaction of stock prices to different stages of the legislation process. This is in stark contrast to other studies that have focused on the response of stock markets to the passage of the new tax law in Parliament. Notable exceptions include Wagner et al. (2018), Gaertner et al. (2020), and Hayo and Mierzwa (2020). These studies, however, investigate stock market reactions to new tax legislation starting from the date the draft bill was presented. Thus, they do not account for potential reactions of investors to political announcements that may precede the release of the draft bill. Our approach allows us to include the very early stage when the idea to introduce a tax enters the public debate.

Second, the setting that we explore (that is, the fact that the announcement concerned a single company) and our data (including data on intraday transactions) increase the probability that what we uncover can be deemed a causal relationship. A weakness of studies of stock market reactions to tax reforms is that it is difficult to exactly establish the degree of vulnerability of a given firm to the proposed tax changes. In consequence, existing studies have had to rely on strong (often implicit) assumptions (e.g., all firms are equally exposed to tax changes) or use proxies (e.g., the scale of investment/presence in one market/sector or another – for an interesting approach along these lines, see, for example, Overesch and Pfritsch, 2021). Relatedly, it is difficult, if at all possible, to take into account that, for different companies, the effect of tax reforms on stock prices can be confounded by different factors or alternative events that might have contributed to stock-price fluctuations. Our study is free of these concerns.

Third, while most studies examining tax reforms are interested in macroeconomic effects, our study can highlight micro-foundations.

Our paper also relates to the following strands of literature. We contribute to studies that investigate stock markets in order to assess the economic consequences of various political events, such as national elections or changes in government (for a literature review see for example Wisniewski, 2016). Typically, the focus is on investigating the electoral cycle in stock market returns or finding positive or negative returns related to political connections after expected or unexpected political turnover (Döpke and Pierdzioch, 2006; Faccio, 2006; Snowberg et al., 2007; Fisman et al., 2012; Maloney and Pickering, 2015; Acemoglu et al., 2016; Fisman and Zitzewitz, 2019). We take a different focus, and instead of looking at election results (political appointments), we investigate the consequence of vague political statements.¹

Another natural point of reference for our study is the literature on the effect of tax reforms on companies' stock prices (Cutler, 1988; Lang and Shackelford, 2000; Knight, 2007; Wagner et al., 2018; Gaertner et al., 2020; Hayo and Mierzwa, 2020). Existing papers usually analyze tax proposals containing at least some details, and therefore the issue of policy-related uncertainty does not arise. In our case, the tax announcement lacked specifics. We show the importance of uncertainty created by politicians.

In this context, our paper is also closely related to the studies that investigate the extent to which asset prices might be affected by the uncertainty about fiscal policies (Sialm, 2006; Croce et al., 2012) or studies of stock market reaction to uncertainty about government policies in general (Feeney and Hillman, 2001; Pastor and Veronesi, 2012, 2013). These studies, however, are theoretical. In contrast, we look at actual stock market reactions.

Our study is also related to research on natural resource taxation. The available literature has mainly focused on the differentiated effects that taxation of petroleum and minerals can have on economic and political outcomes (McGuirk, 2013; Crivelli and Gupta, 2014; Sun et al., 2022). In addition, an extensive theoretical literature has emerged on when and why governments in resource-rich countries should establish a future-generations fund to transform a temporary windfall into a permanent one (James et al., 2022). To the best of our knowledge, however, the manner of announcing the introduction of such taxes and their impact on stock markets have not been studied.

Last, our focus on Poland provides some balance for past research. Most of the literature has concerned the U.S. For Europe, Western countries have attracted much of the attention. Countries from Central and Eastern Europe (CEE) have typically been neglected. Poland has the sixth largest economy in the European Union with the Warsaw Stock Exchange being the largest stock exchange in the CEE region. There has been little research on the responses of that market to political news. Exceptions include Białkowski et al. (2008), who investigated the impact of national elections on stock markets in a group of OECD countries, including Poland; Szymański and Wojtalik (2022), who undertook a similar analysis but distinguished between different types of elections (presidential, parliamentary and local); and Podgórski (2020), who investigated the response of the stock market to a change in prime minister in 2017.

In the following section, we present key information. The next sections present our empirical strategy and data, and results,

¹ From this perspective our work is also related to an extensive body of work that investigates the impact of communication on monetary policy on various economic outcomes (see, for example, Blinder et al., 2008; Hayo and Neuenkirch, 2015; Moessner et al., 2017; Ferrara and Angino, 2022).

Table 1

Revenue from the tax on the extraction of certain minerals and general government balance.

	2010	2011	2012	2013	2014	2015	2016	2017	2018
revenue from the extraction tax (billion PLN)			1.4	1.9	1.4	1.6	1.3	1.8	1.7
government balance (billion PLN)	-107.1	-77.7	-61.5	-69.6	-62.4	-46.8	-44.5	-29.6	-5.2
government balance (% of GDP)	-7.4	-5.0	-3.8	-4.2	-3.6	-2.6	-2.4	-1.5	-0.2

Source: Own elaboration based on data from KGHM, and Eurostat.

Note: we refer to the general government balance. After elections on 25 October 2015 PO-PSL coalition was replaced by PiS government.

respectively. The final section discusses our findings and concludes.

2. Background information

2.1. Exposé

The exposé was delivered on Friday, November 18, 2011 and marked the beginning of Donald Tusk's second term as prime minister.² In his speech, Tusk set out the executive's plans and priorities for the coming period. Given the financial crisis that was taking place in the world at that time, issues related to public finances and economic growth figured prominently in his address. In this context, emphasis was placed on the need to reduce the budget deficit and public debt. This issue took on additional significance because Poland had been subject to the European Commission Excessive Deficit Procedure since 2009. Consequently, much of the speech was devoted to fiscal issues in general and to taxes in particular. In his address to Parliament, Tusk stated that:

"We want, firstly, to significantly increase and modernize the tribute which we currently collect insufficiently, on extracted natural resources (mainly copper and silver)."

He added that:

"It is worth remembering that, according to international sources, the deposits of these two riches, which are very important for Poland, are among the largest in the world and the largest in Europe. We want the taxation of these reserves, of these two ores, but also of other minerals, to be a constant source, a constant stream supporting the development of the Polish economy."

This was the only information that was disclosed. In fact, if we look at the first sentence, Tusk devoted just 25 words to the new tax³ (out of around 5800 words in his whole exposé). The statement gave no details regarding the tax, and thus the market had little information to adjust beliefs about the planned tax. Indeed, there was uncertainty about how much revenue it would bring to the state budget and when it would enter into force. In addition, there was uncertainty concerning the government's future fiscal plans. This is because the announcement of the new levy was not expected at all. Donald Tusk and his party, the Civic Platform (PO), were considered pro-market. The electoral campaign and promises made by PO did not foretell such a turn of events. In consequence, investors' perceptions about government plans had to be changed.

2.2. KGHM

While the tax announcement was vague, the reference to copper and silver allowed one to assume that the new levy would target profits of KGHM Polska Miedź S.A., one of the world's leading copper and silver producers and the only company in this sector in Poland.⁴ It had been a substantial provider of government revenue.⁵ While the imposition of the new levy would increase government receipts from the company even further, at the time the tax was announced, no estimates of the planned revenue were given.

² The then government coalition consisted of the Civic Platform (PO) and the Polish Peasant Party (PSL).

³ We refer here to the Polish language version.

⁴ The company produces approximately 700 thousand tons of copper and around 1200 tons of silver annually (see <https://kghm.com/en/our-business/products>; accessed on March 10th, 2023). This places KGHM among the top ten copper and top three silver producers. A ranking of the world's largest copper producers can be found at: <https://www.statista.com/statistics/281023/leading-copper-producers-worldwide-by-output/> (accessed on March 10th, 2023). In addition, according to U.S. Geological Survey, Poland is among the top ten countries with largest copper deposits (<https://www.usgs.gov/centers/national-minerals-information-center/mineral-commodity-summaries>; accessed on March 10th, 2023).

⁵ In recent years, it had been generating annual revenues in excess of 20 billion PLN (~5 billion EUR) (see <https://kghm.com/en/investors/results-center>; accessed on March 10th, 2023). Data on tax contributions by companies operating in Poland can be found at the official webpage of the Polish Ministry of Finance: <https://www.gov.pl/web/finanse/indywidualne-dane-podatnikow-cit>; accessed on March 10th, 2023).

2.3. The new levy

The introduction of an additional tax for KGHM was related to the condition of public finances in Poland. Because Poland was subject to the excessive deficit procedure (EDP) stemming from Article 126 of the Treaty on the Functioning of the European Union,⁶ the Polish government was looking for additional sources of revenue for the budget. As shown in Table 1, which reports the revenues that the government finally managed to raise from this tax in subsequent years, these amounts were clearly significant in the context of Polish public finance.⁷ For instance, in 2012, the year in which the new tax came into force, the deficit fell by 16.2 billion PLN as compared to 2011, and the revenue from the extraction tax was about 1.4 billion PLN. Thus, the latter amount accounted for 8.8% of the former. Overall, however, the net extra proceeds to the treasury from KGHM were lower than the amounts shown in Table 1. This is because, following the introduction of the new tax, both CIT receipts and the amounts raised by the treasury in dividends fell.⁸

Nevertheless, the new tax left a strong imprint on KGHM's finances, which was the sole payer of this levy. Indeed, for the company, the tax burden from the new levy was higher than the existing CIT burden. As a result, the company's tax liability increased significantly (Hausner, 2015). Below we document the response of investors to the intent of introducing the new tax. The company's shares had been traded on the Warsaw Stock Exchange since 1997. The largest shareholder has always been the State Treasury, which at the time of writing held 31.79% of the shares, which in practice gives it a controlling interest. This has remained stable since January 2010 (previously the State Treasury was the owner of 41.79% of the shares). The remainder belongs to domestic and foreign investment funds and individual investors.

3. Empirical strategy and data

Our empirical strategy draws on an event study approach. We define event day 0 as November 18 (Friday) and event day 1 as November 21 (Monday) with subsequent event days corresponding to subsequent trading days. Cumulative abnormal returns were calculated using the market model as follows:

$$CAR[0, n] = \sum_{t=0}^n AR_t$$

where $CAR[0, n]$ is the cumulative abnormal return for KGHM for event days 0 through n . AR_t is calculated as

$$AR_t = R_t - [\hat{\alpha} + \hat{\beta}R_{mt}]$$

where AR_t is the abnormal return for KGHM on event day t , R_t is the actual return on KGHM for event day t , and R_{mt} is the return on market for event day t . Depending on the specification, we use different variables for the market return (see further). $\hat{\alpha}$ and $\hat{\beta}$ are estimated from the following model on a default pre-event sample of 220 trading days ending 30 days prior to event day 0.

$$R_t = \alpha + \beta R_{mt} + \varepsilon_t$$

Data used in this paper come from various sources. First, all data on stocks of KGHM and other Polish companies (which are used in some specifications to calculate the market return) come from the Warsaw Stock Exchange. Second, given the fact that KGHM is a global player, in some specifications of the market model, the market return is calculated using data either on the valuation of other largest copper producers or copper prices. The former refer to the closing prices at the New York Stock Exchange and were downloaded from Yahoo Finance, whereas the latter - copper stock quote (HG:CMX) - comes from the Chicago Mercantile Exchange and was downloaded from Nasdaq. In order to take into account potential idiosyncrasies in measurement due to particular stocks, in some specifications we look at closing prices of Global X Copper Miners ETF (COPX) listed at the NYSEArca, which was downloaded from

⁶ The goal of the EDP is to correct the excessive deficit and/or debt levels in EU countries. "The EDP can be launched if an EU country: having breached or being in risk of breaching the deficit threshold of 3% of GDP; or having violated the debt rule by having a government debt level above 60% of GDP, which is not diminishing at a satisfactory pace (the gap between a country's debt level and the 60% reference needs to be reduced by one 20th annually (on average over 3 years)"; see https://eur-lex.europa.eu/legal-content/PL/TXT/?uri=LEGISSUM:excessive_deficit_procedure# (accessed on March 10th, 2023).

⁷ In regard of tax technicalities, the tax liability arises on the date of production of concentrate from the copper ore extracted by the taxpayer or on the date of extraction of that ore (if the taxpayer does not produce concentrate from extracted copper ore). In the case of copper and silver, the taxable amount is the amount of copper and silver contained in the concentrate produced, or the amount of copper and silver contained in extracted copper ore. Tax rates are determined separately for a tonne of copper and a kilogram of silver. They are calculated cyclically each month based on: the arithmetic mean of daily copper prices on the London Metal Exchange (LME), the arithmetic average of daily silver prices at the London Bullion Market Association (LBMA), and the arithmetic mean of the average USD/PLN exchange rates announced by the National Bank of Poland. All further details, including those regarding how exactly the tax is calculated, can be found in the law of 2 March 2012 on the tax on extraction of certain minerals (Ustawa z dnia 2 marca 2012 r. o podatku od wydobycia niektórych kopaliny, Dz.U. 2012 poz. 362). A discussion of these provisions can also be found, for example, in Duda (2013).

⁸ The net revenues were positive though. The average annual receipts from the new tax in 2012–2016 were 1.5 billion PLN. The proceeds from dividends decreased from about 0.6 billion PLN (the average for 2008–2010) to 0.2 billion PLN (the average for 2012–2016), while the proceeds from CIT decreased from about 1.7 billion PLN (the average for 2010–2011) to about 1 billion PLN (the average for 2012–2016).

Yahoo Finance. The fund seeks to provide investment results that correspond generally to the price and yield performance of the Solactive Global Copper Miners Index. The fund will normally invest at least 80% of its assets in the securities of the underlying index, which is designed to measure broad-based equity market performance of global companies involved in the copper mining industry.

Our investigation is also supported by other types of data, which we use to identify the legislative procedure that the new bill had to go through and the government's communication of the tax with the public. The data on legislative speech on KGHM come from the Sejm's webpage. We have data with transcripts of all stenographic records made in the Sejm during the period under analysis. This allows us to indicate the exact dates of the parliamentary meetings at which KGHM-related issues were discussed. The government's communication of the tax with the public, in turn, was reconstructed on the basis of press reports. More specifically, we analyzed the content of three leading titles: the weekly "Newsweek" and two dailies "Gazeta Wyborcza" and "Puls Biznesu". This helped us to identify when new information on the tax was available.

4. Results

4.1. Market reaction to the exposé

We start by plotting KGHM stocks' valuation in the period between November 1, 2011 and May 1, 2012 (Fig. 1). This gives 130 trading days in total and the time window was selected in such a way that it covers all the important events surrounding the introduction of the tax (from the exposé to the day the law came into force). The figure reports KGHM stocks at the closing of the market on a given day. The figure highlights key dates indicating subsequent stages of the legislative process and days when further information on the tax was revealed.

The exposé of Donald Tusk is marked by a red line, second from the left (November 18, 2011). The tax law was passed by Parliament on March 2, 2012 (marked with an olive green line, second from the right) and entered into force on April 18, 2012 (marked with a gray line, furthest to the right). The black line (furthest to the left) indicates when the company published its quarterly report (November 10, 2011). The green line (third from the left) indicates when the Ministry of Finance revealed how much money they aimed to raise with the new tax (November 22, 2011). The yellow line (fourth from the left) marks the date of the first parliamentary meeting at which KGHM-related issues were notably raised (December 1, 2012). The dark blue line (fifth from the left) highlights when the bill appeared on the website of the Ministry of Finance (December 15, 2011). The orange line marks the day when the Ministry announced that the tax rate will be lower (January 12, 2012), whereas the purple line indicates the date when the bill was submitted to the Sejm (January 19, 2012). Finally, the light blue line and brown line (January 26, 2012 and February 28, 2012, third and fourth line from the right, respectively) indicate when the first and second reading of the bill in Parliament took place.

Three attributes are particularly worth noting. First and foremost, as clearly shown, the prime-minister's exposé coincided with an immediate and profound decline in the valuation of KGHM stocks. The nominal closing price from the day of the exposé was 14% lower than the nominal closing price from the day before. When we look at the history of KGHM stocks (from July 1997 until April 2022), the decrease on the day of Tusk's exposé was the fifth-largest daily decline in almost 6200 trading days.⁹

The second attribute to observe is that the drop in KGHM stock price was not limited to the day of the exposé and the shares also fell in the following days. After four trading days, the nominal closing price was 25% lower than that from the day before the exposé and the local minimum was reached on December 19, 2012, when the nominal closing price was almost 38% lower than that observed on the day before the prime minister addressed the Parliament. One can also note that the number of transactions (24,240) on Monday following the Friday's exposé was the highest ever recorded in the history of the company stock market listing, much higher than that observed on the day of Tusk's speech (14,123).¹⁰ We argue that the fact that the market reaction to the exposé was not confined to one day can be accounted for by the uncertainty about what the proposed tax would look like in detail, when it would be introduced, and the conditional probability that it would be introduced at all.¹¹

The third observation in relation to Fig. 1 is that no extraordinary reaction of KGHM stocks can be seen either to the entry of the tax law into force (gray line on the graph), or to its voting/debating in the Sejm (olive green, light blue, brown, purple lines). This, in turn, seems to indicate that adjustments to the new tax had already taken place prior to these events and the role of Parliament in discussing/amending the proposed law was very limited. What appears to have been of importance for the market is the publication of the draft bill on the website of the Ministry of Finance (dark blue line) on December 15, 2011. The most important information released on that

⁹ It can be also noted that, since Tusk started his exposé at 12:00, investors did not have a full trading day to react to the announcement about the new tax. Thus, it seems plausible to assume that allowing them to trade on that day longer could have resulted in an even greater decrease in the company's stock price.

¹⁰ As a reference point, the average number of daily transactions in the year preceding the exposé (i.e. in the period between November 17, 2010 and November 17, 2011) was 3,950, and the median was 3,525.

¹¹ An alternative explanation for the prolonged decrease in KGHM stocks in response to the prime minister's address would draw on the fact that the tax proposal was completely unexpected by the market and some investors needed some time to process this information and react (Mondria et al., 2022).

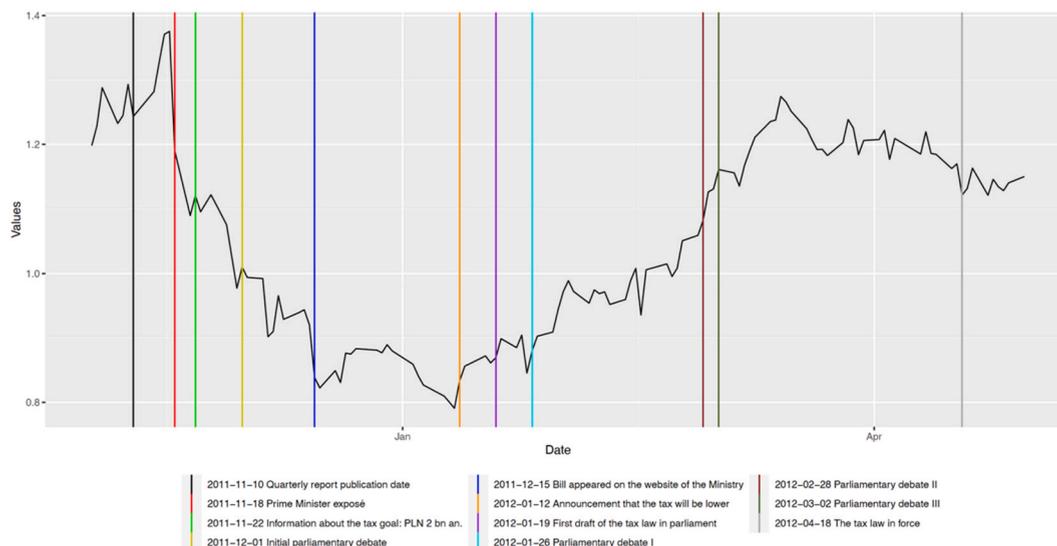


Fig. 1. Valuation of stocks of KGHM relative to stocks of FCX between August 2011 and August 2012.

Source: Own elaboration based on data from the Warsaw Stock Exchange, NYSE, KGHM, press reports and the Sejm. Please note that the figure reports closing prices (that is the last transacted prices before the market officially closes for normal trading). The closing price on November 17, the day preceding the exposé, was 167 PLN, whereas the closing price on November 18, the day of exposé, was 143.9 PLN.

day concerned how the tax would be calculated. In consequence, it became possible to calculate, even if only as an estimate, the tax burden that KGHM might incur in the future.¹² In addition, in the release the Ministry of Finance also stated that the tax is expected to bring in PLN 1.8 billion to the budget in 2012, and PLN 2.2 billion in subsequent years. This again allowed the investors to better understand the consequences of the new levy for KGHM. Furthermore, the Ministry of Finance set the law's effective date at March 1, 2012 (earlier, the Ministry announced that the tax would go into effect on April 1, 2012). Making the draft bill available to investors was followed by a relatively sharp and negative market reaction, as the nominal share price fell by 14%. One might argue, however, that this was the moment when most of the uncertainty surrounding the tax was clarified. Indeed, once the information revealed that day was analyzed, the declines in the company's share price (at least in nominal terms) came to an end. As for the other changes in the company's share price, linking them to either the new information on the tax or the accompanying debate (identified on the basis of stenographic records of sessions of the Sejm or press reports) seems questionable.¹³ Clearly, while the co-occurrence of Tusk's exposé and the decline in KGHM stocks is very suggestive, one could argue that the two are only spuriously correlated and the drop in share prices was driven by other events. Below we show that it is rather difficult to sustain this line of argumentation.

4.2. Intraday transactions data

As a first step, we explore intraday transactions data. Based on the video transmission of the parliamentary sitting of November 18, 2011, it can be established that the words concerning the new tax were said between 12:20:00 and 12:20:40.¹⁴ As depicted in Fig. 2, which presents KGHM stock prices on the day of exposé, the market reaction was at exactly 12:22. In other words, the first major drop in KGHM stocks (of 5.2%) occurred less than 2 min after the news on the new tax became known to the public. In addition, on the very same day the prices further declined by 8.6%. Furthermore, the opening price on Monday, November 21, 2011 was 7% lower than the closing price on Friday's exposé. This clearly shows that the two events (the exposé and the drop in stocks) appear to be very strongly related to each other.

¹² It became clear that for silver and copper the amount of the new levy would be tied to the average market prices for these bullions and that it is to be paid monthly. The amount of bullion to be taxed was announced as the weight of mined copper and silver contained in the concentrate produced (in case the taxpayer does not produce a concentrate from mined ore, the taxable amount is the weight of copper and silver in the mined ore).

¹³ A potential exception to this is the announcement on January 12, 2012 (orange line) by the ministry that tax rates will be lower. However, while on that day the share price went up by 8%, we do not observe any immediate market reaction and the increase was gradually spread over several hours. One cannot exclude, however, that this was due the fact that investors needed some time to fully discount this new information.

¹⁴ The broadcast is available on the website of the Sejm and can be accessed at: https://www.sejm.gov.pl/sejm7.nsf/transmisje_arch.xsp?rok=2011&month=11&type=posiedzenie#3F7F65F3562916D7C125794A0039F91B (accessed on March 10th, 2023).

4.3. Alternative explanations for the decline in KGHM stocks

Financial troubles

An alternative explanation for the decline in KGHM stocks is that the company encountered financial difficulties and that the drop in share prices was simply due to discounting this information by the market. We believe that this explanation is not convincing at all. This claim is based on the fact that on November 10, 2011 (see the green line in the graph), that is, eight days before the exposé, the company published its quarterly financial report, and it did not cause any nervous reactions in the market. This is visible in [Figure A1](#) in the appendix, which brings closer the valuation of KGHM stocks from the mid-October 2011 till the beginning of January 2012. We do not see any serious decline between the publication of the report (green line) and the exposé (red line). In addition, according to press reports, analysts' assessments of the company's results were positive. Furthermore, three days before Tusk's exposé KGHM announced plans to repurchase 3 billion PLN in stock and this was also positively received by the market.¹⁵

Turmoil on the Warsaw Stock Exchange

Another alternative explanation for the decline in KGHM stocks can be that it was due to a generally poor performance of stocks listed on the Warsaw Stock Exchange. That said, no matter whether we look at the valuation of KGHM stocks relative to the WIG index (comprising all companies listed on the Warsaw Stock Exchange Main List that meet base eligibility criteria) or to stocks of other state-owned mining companies listed on the Warsaw Stock Exchange (PGNiG - the leader in the Polish natural gas market; JSW - one of the leading producers of coking coal in the European Union), we always find a sharp decline in KGHM stocks on the day of prime minister's address to Parliament (see [Figures A2-A4](#)). This suggests that linking the decline in KGHM share price to the stock market turmoil is hardly convincing.

Global trends

Since KGHM is a global company it could be argued that its stocks are affected by global factors, which, by chance, left their mark on the company at the time when Prime Minister Tusk announced plans to tax certain minerals. In order to test this hypothesis, we check the changes of KGHM stocks relativized to the global price of copper, and to stocks of another giant in this industry, American Freeport-McMoRan (FCX). In addition, we relate KGHM stocks to closing prices of Global X Copper Miners ETF (COPX). As before, the portrayal we obtain is very similar to the ones we observed earlier (see the appendix and [Figures A5, A6 and A7](#), respectively). Regardless of the point of reference, we find a very sharp decline in the valuation of the company exactly co-occurring with the exposé of Donald Tusk. Furthermore, the decline is always of similar magnitude, which further strengthens the supposition that it was driven by announcing plans to tax KGHM, irrespective of how vague those plans were.

Event study

While these conclusions are based mostly on graphical analysis, they are fully confirmed by the output of the abnormal returns model. [Table 2](#) presents cumulative abnormal returns for KGHM in various event windows: 1, 5, and 10 days after the exposé on November 18, 2011. In order to check the robustness of our results, and to potentially test the above-mentioned alternative explanations for the declines in KGHM's share price, we use different points of reference for calculating market returns. These are, depending on the specification: WIG index (i.e. the value of the main index at the Warsaw Stock Exchange), PGNiG (share prices of another major company in the mining sector in Poland), FCX (share prices of Freeport-McMoRan), COPX (the value of the Global X Copper Miners ETF) and HG:CMX (global copper prices).

The obtained results imply that the exposé has exercised a significant negative impact on KGHM. More specifically, we find that a cumulative abnormal return after the first full day of trading was about -20%, about -25% after five trading days, and about -30% after ten trading days. Significantly, these results hold regardless of what point of reference we take for calculating market returns. Furthermore, our findings are robust to changing lower or upper bounds of an estimation window.¹⁶

Assessing the scale of policy-related uncertainty. In order to provide further insights on these results, and to assess the scale of policy-related uncertainty which investors faced after the exposé, we take a closer look at the pattern of declines in the company's valuation. In particular, we look at the difference between the drop in the first 2 min after the exposé and the final price drop. Let us assume that our estimates of the ten-day abnormal returns correctly approximate the scale of declines in KGHM's stocks, which can be attributed to the introduction of the tax. The lower bound of our estimates (26.76%) indicates at least a five-fold underestimation by investors of the scale of the declines (5.2 pp of real declines at the first moment and 21.56 pp of later declines).

¹⁵ Ultimately, the buyback was not approved at an extraordinary general meeting that took place on 19 January 2012. The option was blocked by a representative of the State Treasury, despite the fact that initial comments from the ministry were favorable to the board's decision. For a statement by a Treasury spokesman on November 16, 2011 see, for instance, an article "KGHM chce skupić własne akcje za 3 mld zł" that can be found at <https://wyborcza.biz/biznes/7,177151,10649703,kgmh-chce-skupic-wlasne-akcje-za-3-mld-zl.html> (accessed on March 10th, 2023).

¹⁶ As mentioned on p. 9, the lower bound of the estimation window is 250 days before the event date, whereas the upper bound is 30 days before the exposé. Moving the lower bound from (-250) to (-300), (-200), or (-150) does not qualitatively change our results. The same holds for moving the upper bound from (-30) to (-50), (-40) or (-20). Following the suggestion by an anonymous Reviewer, we also checked the models in which we eliminate the upper bound and the estimation window includes 250, 90, or 60 days right before the event. Our results always remain qualitatively the same.

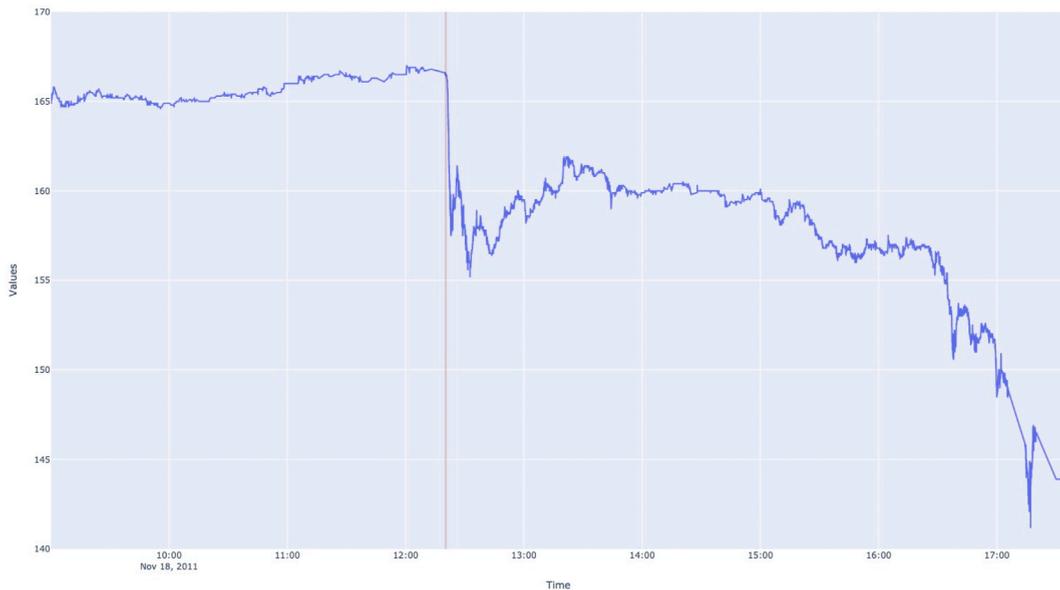


Fig. 2. Intraday KGHM stock prices – November 18, 2011

Source: Own elaboration based on data from the Warsaw Stock Exchange.

Note: The red line indicates the point in time when Prime Minister Tusk speaks about the new tax.

An alternative way to assess the scale of uncertainty, would be to refer to changes in the company's stock prices during the events that can be clearly linked to the proposed tax, but did not necessarily take place during the first ten days after Tusk's announcement. Based on press reports and intraday transactions data we were able to identify four instances where KGHM's share price fell sharply. First, we focus on further declines on the day of the exposé which amounted to 8.6%. Second, we focus on the KGHM's valuation over the weekend after the exposé when we observed an additional decline of about 7%. Third, we focus on the decline (by 11.15%) in response to the release of the draft bill on the ministry's website. Finally, we focus on the declines in the company's stock prices on the day after the draft bill was made available when KGHM's stock prices fell by 5.4%. The product of the declines taking place during these four events gives a cumulative decline of 28.55%. As before, comparing this figure with an immediate market reaction to Tusk's exposé (5.2%) allows one to estimate the scale of uncertainty surrounding the announcement of the new tax.

Last, but not least, we can take a closer look at the company's dividend payments after the tax was introduced. At the time of the exposé, investors knew the company's financial reporting for three quarters of 2011. Let us assume that this information allowed them to correctly predict the dividend for the year (which amounted to 5.7 billion PLN). After the exposé, investors learned that the Ministry of Finance expects the proceeds from the new tax to amount to 2 billion PLN. In this context, they might have expected that after introducing the tax the dividend would be reduced by 35% (2 billion PLN/5.7 billion PLN). This again can be collated with the immediate market reaction of 5.2%, suggesting that the market underreacted. Overall therefore, one can suspect that the immediate reaction of investors, who would have known that the tax would definitely be introduced in the following year and that the expected budget receipts would be around 2 billion PLN, would have been much stronger than the one we observed after the vague and perfunctory announcements made in the prime minister's exposé.¹⁷

5. Concluding remarks

We have studied politically induced uncertainty through the vague announcement of a natural-resource tax. While stock-market prices of companies that are going to lose from a new tax are expected to fall, an interesting question concerns market reaction to imprecision in political statements that contain no details whatsoever about what a tax would look like. To the best of our knowledge, this has not been studied. Rather, studies typically investigate stock market reactions to the release of a draft bill of a new tax law or to

¹⁷ The final point worth making here is that in the case some of the declines in KGHM stocks after the vague announcement were driven by automated orders placed with a broker or simple herding behavior, our assessment of the scale of the uncertainty surrounding the company's share prices which we presented above was too low. Please note that both these mechanisms (herding behavior and automatic trigger points such as stop-loss order), if they really worked, were consistent with the initial market reaction. Suppose now that the initial market reaction to the prime minister's announcement was, for example, 3% and the additional decline, which we observed (in total we observed that stocks fell by 5.2%) was purely driven by stop-loss orders. In that case the initial underreaction (and thus the uncertainty related to vague political pronouncement), when compared to cumulative declines was even greater than we assumed above: this is because in the above-mentioned calculations instead of taking 5.2% as a reference point, 3% should have been taken.

Table 2
Cumulative abnormal returns for KGHM.

reference point (return on the market)	CAR for event windows		
	[0,1]	[0,5]	[0,10]
WIG index	-17.575%***	-23.054%***	-26.758%***
PGNiG	-21.710%***	-24.066%***	-38.027%***
FCX	-23.055%***	-26.365%***	-33.819%***
COPX	-20.489%***	-26.214%***	-32.135%***
CMX	-21.659%***	-27.199%***	-29.337%***

Source: Own elaboration based on data from the Warsaw Stock Exchange and NYSE.

Note: *** p-value <.01. Asterisks denote significance level of a test suggested by [Boehmer et al. \(1991\)](#). Applying the test based on [Kolari and Pynnönen \(2010\)](#) brings qualitatively the same results.

the passage of the tax reform in Parliament, i.e. when most of, or all, details of the future tax policy are already known. Our example has concerned stock prices of one of the world's leading copper and silver producers, Polish KGHM, and the reaction to a single sentence uttered by Donald Tusk in November 2011 during his address to Parliament. As documented in the paper, we observe an immediate and sharp decrease in KGHM stocks on the day the speech was delivered. In the following days, we find further declines in stock prices, which reflects gradual removal of tax-related uncertainty, with investors' acquiring additional information and adjusting their beliefs about government success in executing the proposed policy. As we show, the cumulative abnormal negative returns for KGHM stock were large: about -20% after the first full trading day and about -30% after ten trading days.

KGHM stock prices also fell subsequently and hence it is likely that the overall impact of the tax announcement on the company's share prices was greater than our estimates show. This can be vividly illustrated, for example, by the immediate downward reaction of the stock market to the publication of the draft bill on the ministry's website, which happened about a month after the exposé (so this event is not captured in our model). Clearly, it would be incorrect to argue that all the decreases that took place after ten trading days were driven solely by the tax-related issues. This was definitely not the case. The more time that passed since the exposé, the more events could have affected the company's share price. In the period between the exposé and voting the tax law in Parliament, we identified, for example, information about KGHM investments in Chile (December 2011), changes in the company's supervisory board (January 2012) or an extraordinary general meeting of shareholders (January 2012). These and other events might have affected the moods of investors, and therefore their decisions on whether to buy/sell KGHM's stock. What the prolonged impact of the tax announcement shows, however, is that extending the period of uncertainty, and this was fully under control of the government, can have far-reaching consequences in stock markets that could not be predicted in advance.

Our findings show that politicians' expectations that markets do not respond to vague statements are incorrect. Also, notifying markets as early as possible about a profit change is good policy, reflecting the requirement of companies to alert capital markets as soon as major changes in profits can be expected.¹⁸ According to this prescription, however, we would have expected the prime minister to tell the markets about his tax plans before the elections and not during his exposé. Moreover, we would expect him to give the markets some details of the proposal and not just mention them in passing.

Another point directly related to our analysis, and that could be the subject for future inquiry, is that vague tax announcements can have not only short-term consequences in the form of lower valuation of stock prices, but also longer term impacts as regards the company's dividend payment policy and its tax optimization strategy. The case that we investigate in this paper provides an excellent illustration. While KGHM had to pay the new levy, it is very likely that this had an influence on the other type of receipts that the government received from the company. What we observe is that, after the introduction of the new tax, both the dividend paid by KGHM and its CIT contributions diminished. It would be interesting to know to what extent the government expected lower receipts from these two sources and what potential tools they might have used to maximize the net revenues from the company. The fact that the state has always had the controlling interest in KGHM may be particularly relevant in this context.

We hope that this paper can serve as a good introduction to subsequent analyses of the threads sketched above and as an inspiration for examining similar cases observed in other geographical or historical contexts. Studying the consequences of announcing/introducing taxes on extraction of natural resources in other countries can be seen as one possible extension of our work. An investigation into the stock market reaction to the recent announcements and introduction of windfall taxes on banks and/or energy firms in several countries around the world could be another potential research area.

Declaration of competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

¹⁸ We would like to thank an anonymous Reviewer for drawing our attention to this point.

Acknowledgments

We are grateful to Arye L. Hillman and two anonymous Reviewers for the superb feedback on our manuscript. We would also like to thank participants at the 31st Political Economy Workshop in Silvaplana, 3rd Ariel Conference on the Political Economy of Public Policy (2022) WINIR conference, 2022 WIEM conference in Warsaw and 2022 WNE UW conference in Janów Podlaski for the helpful comments. We also give thanks to Maciej Wysocki for the excellent research assistance and the representatives of the Warsaw Stock Exchange for providing detailed transaction data. This research has been financed within the Opus 19 Program of the National Science Centre (NCN), Poland. Project title: Political polarization and parliamentary voting on economic policies: the case of Poland 2005–2019, project no: UMO-2020/37/B/HS4/00787.

Appendix

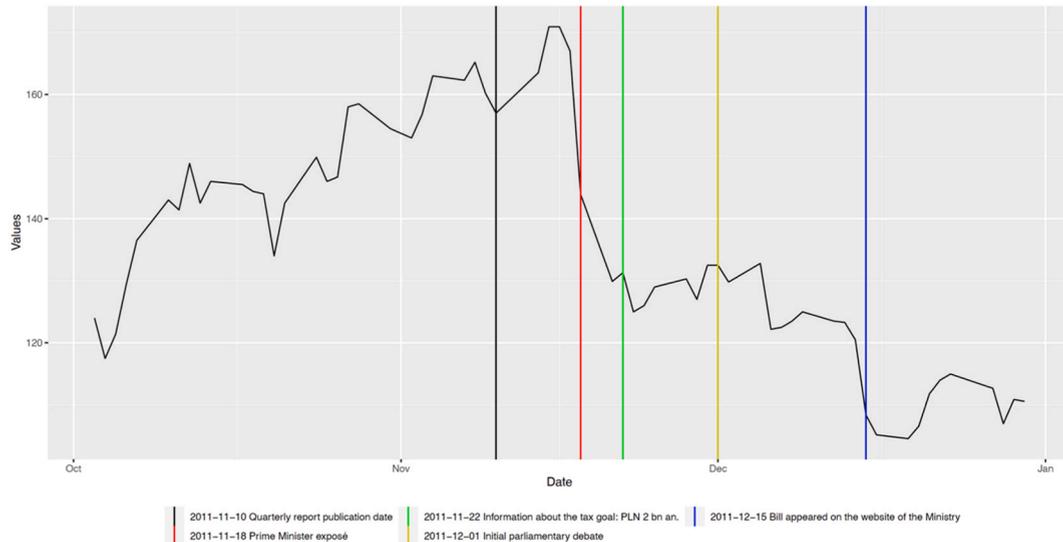


Fig. A1. Valuation of stocks of KGHM between mid-October 2011 and early January 2012 – closing prices.

Source: Own elaboration based on data from the Warsaw Stock Exchange, KGHM, and the Sejm

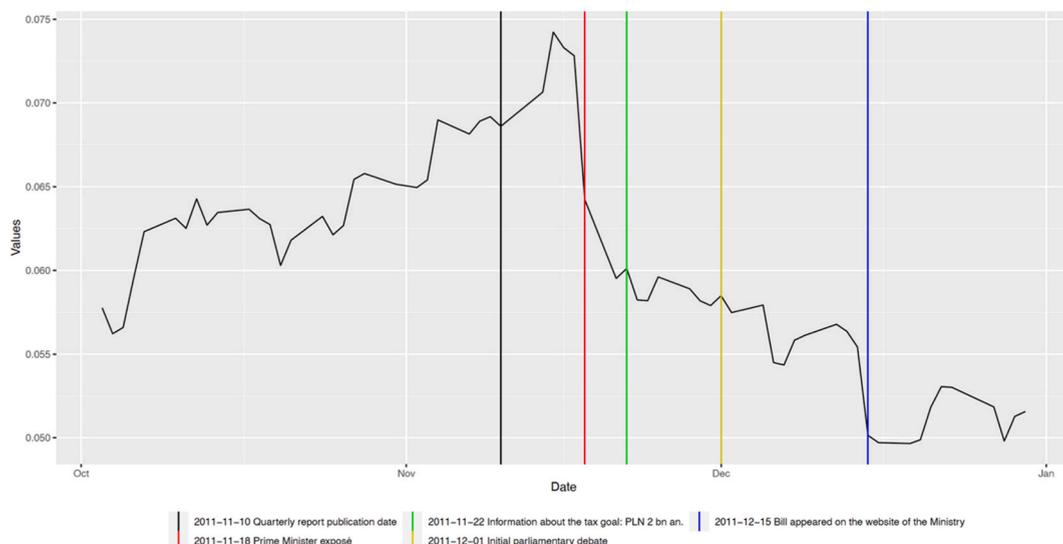


Fig. A2. Valuation of stocks of KGHM between mid-October 2011 and early January 2012 – closing prices, valuation relative to WIG index.

Source: Own elaboration based on data from the Warsaw Stock Exchange, KGHM, and the Sejm. Please note that the figure reports closing prices (that is the last transacted prices before the market officially closes for normal trading).

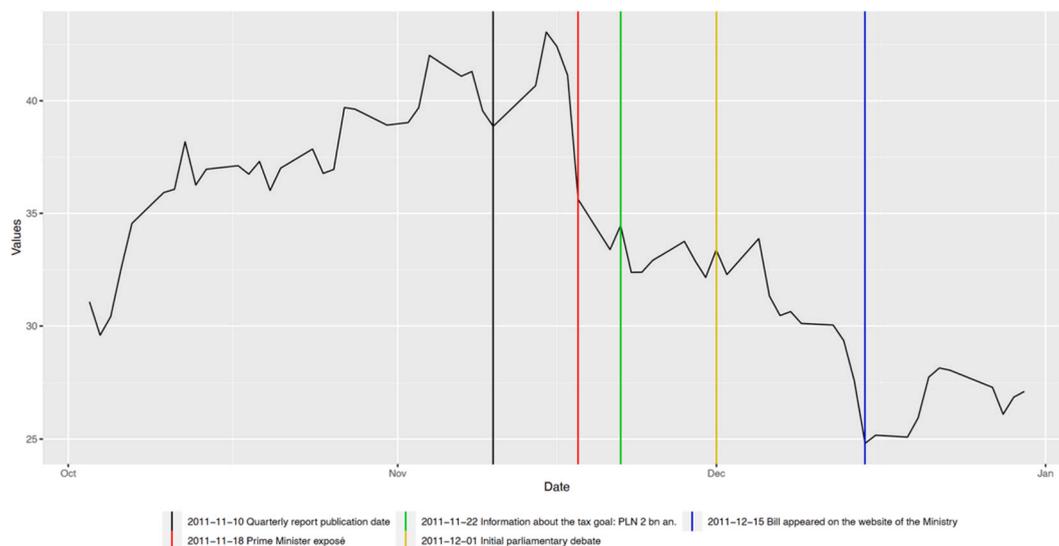


Fig. A3. Valuation of stocks of KGHM between mid-October 2011 and early January 2012 – closing prices, valuation relative to PGNiG. Source: Own elaboration based on data from the Warsaw Stock Exchange, KGHM, and the Sejm. Please note that the figure reports closing prices (that is the last transacted prices before the market officially closes for normal trading).

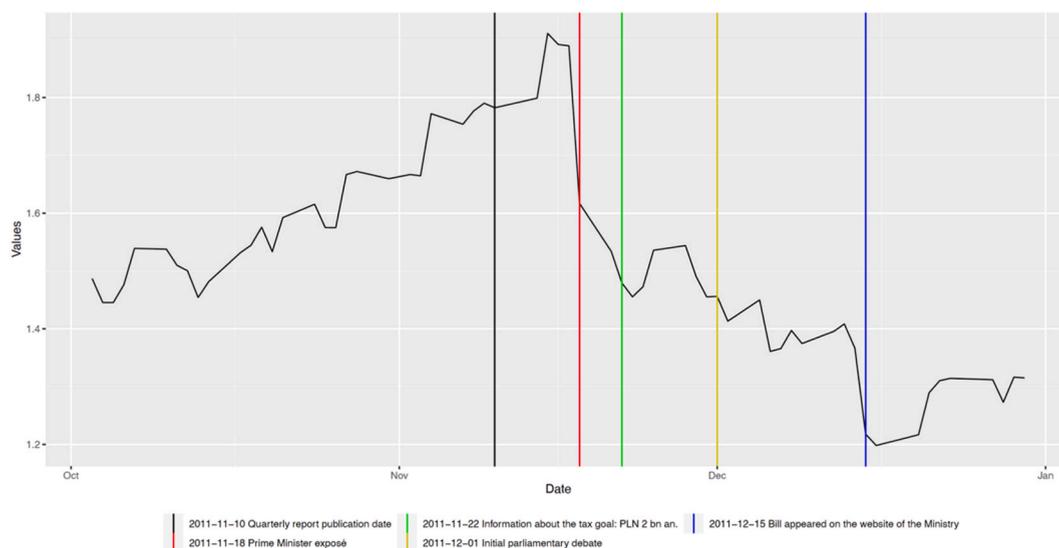


Fig. A4. Valuation of stocks of KGHM between mid-October 2011 and early January 2012 – closing prices, valuation relative to JSW. Source: Own elaboration based on data from the Warsaw Stock Exchange, KGHM, and the Sejm. Please note that the figure reports closing prices (that is the last transacted prices before the market officially closes for normal trading)

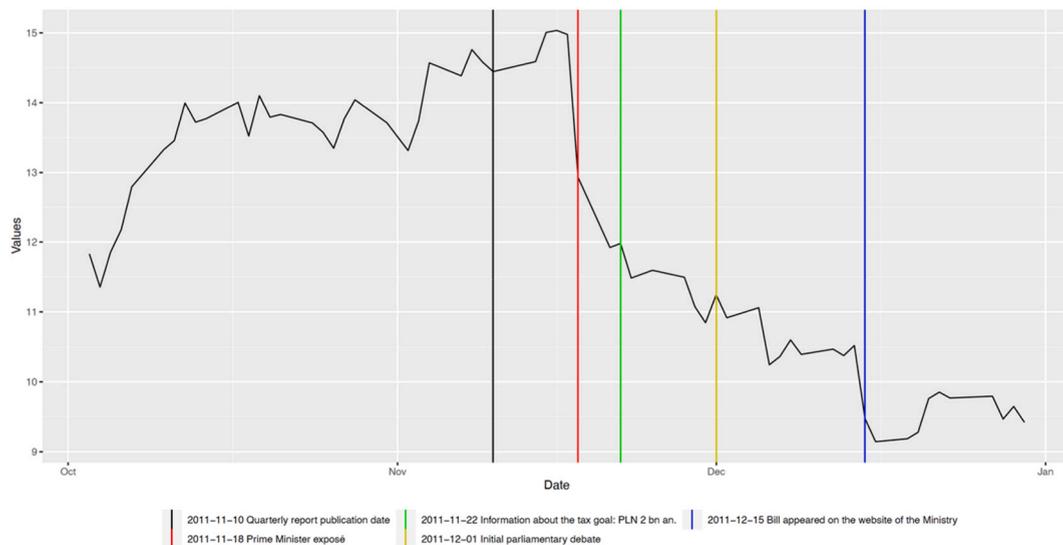


Fig. A5. Valuation of stocks of KGHM between mid-October 2011 and early January 2012 – closing prices, valuation relative to the global price of copper.

Source: Own elaboration based on data from the Warsaw Stock Exchange, KGHM, and the Sejm. Please note that the figure reports closing prices (that is the last transacted prices before the market officially closes for normal trading).

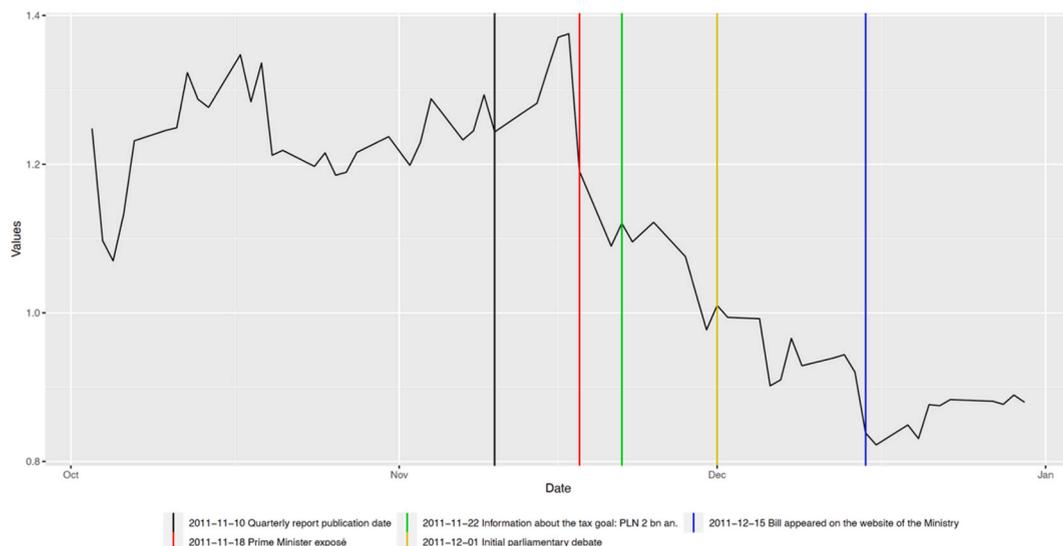


Fig. A6. Valuation of stocks of KGHM between mid-October 2011 and early January 2012 – closing prices, valuation relative to FCX.

Source: Own elaboration based on data from the Warsaw Stock Exchange, KGHM, and the Sejm. Please note that the figure reports closing prices (that is the last transacted prices before the market officially closes for normal trading).

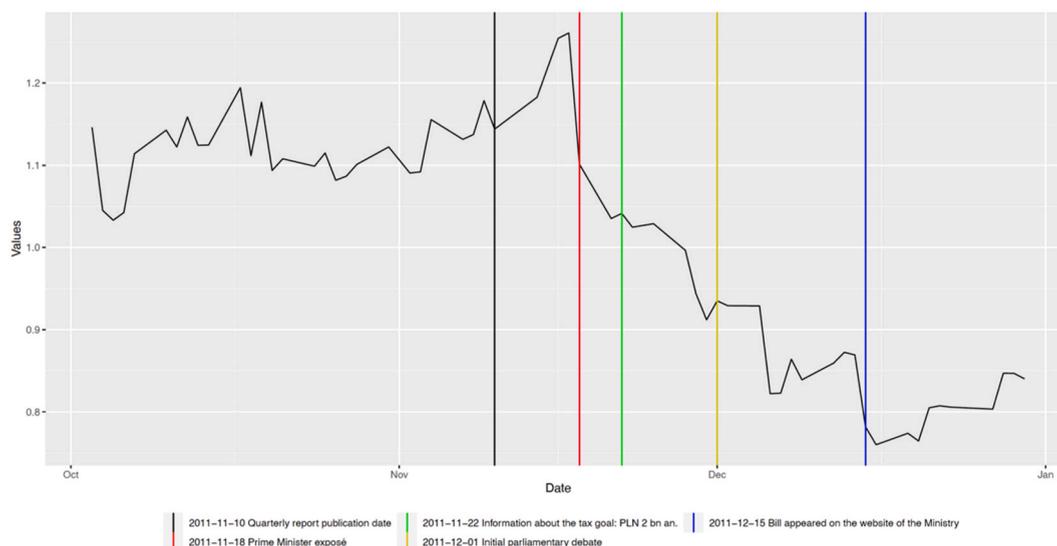


Fig. A7. Valuation of stocks of KGHM between mid-October 2011 and early January 2012 – closing prices, valuation relative to COPX. Source: Own elaboration based on data from the Warsaw Stock Exchange, KGHM, and the Sejm. Please note that the figure reports closing prices (that is the last transacted prices before the market officially closes for normal trading).

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