

CSAE Working Paper WPS/2012-22

Stock Market Reactions to Conflict Diamond Trading Restrictions and Controversies

William Seitz[♦]

In this paper, I explore the reactions of financial market participants to news relating to the Kimberley Process Certification Scheme (KPCS), a body that regulates aspects of global diamond production and trade. I use an event study approach with data on the returns for shares of leading global mining and jewelry retail companies over the period from 1999 to 2011.

I show that the most influential dates related to the KPCS for diamond mining companies were associated with regulatory actions in the early 2000s taken by the United Nations and the United States. These events were associated with lower returns for diamond mining companies. After 2004, jewelry companies experienced abnormal returns coinciding with KPCS-related events, while mining firms appear rarely affected by events during this time. The majority of returns for jewelry companies were negative for events which called into question the ability of the KPCS to ensure conflict-free diamond production and trade. Expanded legal diamond production in some cases coincided with positive returns for jewelry retail companies over the time period I consider.

These results are consistent with the expectation that jewelry companies, which often market directly to consumers, are more sensitive to public perception concerning the KPCS and its credibility. The results are inconsistent with the point of view that the creation of the KPCS was seen by financial market participants as “good news” overall for diamond mining companies. The results also suggest that once trade restrictions were in place, mining companies were less affected by controversies surrounding the credibility of the KPCS.

JEL Classifications: F51 Q34 Q37

Keywords: Diamonds, Natural Resources, Trade Regulation, Event Study

[♦] Ph.D. Candidate in Economics; Department of Economics, Business and Statistics; University of Milan Research Assistant; Centre for the Study of African Economies; Department of Economics University of Oxford
william.seitz@economics.ox.ac.uk

1 Introduction

In 1998, the non-governmental organization (NGO) Global Witness launched a campaign against “blood diamonds”, publicizing the link between diamond production and armed conflict. Not long after, Robert Fowler and a UN panel of experts submitted a report to the UN Security Council detailing the ways in which armed groups evaded sanctions in Angola – which was at that time embroiled in a long-running civil war (UN Panel of Experts, 2000). The report discussed the role of diamonds in funding the armed group *Uniao Nacional Para a Independencia Total de Angola* (UNITA), and provided evidence of actors in the diamond mining and jewelry industries evading UN sanctions.

Also bringing attention to illicit diamond trading in the late 1990s were the brutal tactics of the Revolutionary United Front (RUF) during the civil war in Sierra Leone, which drew global condemnation and resulted in a United Nations Security Council ban on the trade of all diamonds originating in that country.¹

Later that year, the UN Security Council passed a resolution supporting the creation of a global certification procedure for diamonds.² The ultimate multinational response brought about the Kimberley Process Certification Scheme (KPCS), a control and certification body that came into force in 2003 in Interlaken, Switzerland. The KPCS guidelines left individual state members to draft and pass the requisite legislation, and to monitor companies and individuals operating within their jurisdictions.

The KPCS grew to cover 76 represented countries by early 2012 (Kimberley Process, 2012). This group included all major diamond producing countries (covering 99.8% of global rough diamond production), and involved the majority of large national consumer markets. Also represented in KPCS were advocacy and industry observers, including Global Witness and De Beers, the world’s largest diamond mining company. Member states agreed to trade diamonds solely with other member countries, and to halt trade with members who were suspended for violating KPCS rules. The Kimberley Process also required that a KPCS certificate accompany every compliant diamond sold on the international market.

¹ Resolution 1306 on 5 July, 2000

² UN Resolution 56/263

Industry actors participated in the development and promulgation of KPCS-recommended policies, as well as many aspects of the scheme's implementation. This industry involvement proved to be a contentious issue among academics, politicians, business leaders and advocacy organizations, but many KPCS advocates eventually saw the involvement as a means of providing incentives for companies to comply with KPCS regulations. Many saw the system as benefiting the diamond industry by protecting its reputation against charges of supporting violence in diamond producing countries.

The World Diamond Council, a global industry body formed in 2000 to address regulatory drives against conflict diamonds, eventually voted to support the creation of the Kimberly Process. The move prompted many to claim that trade restrictions against violent groups in smaller countries would benefit large-scale diamond companies, and that the primary motivation of companies for supporting the initiative was to gain advantages in the market:

“...this new international system restricts supply and enhances the power of big, established players. It keeps the warlords and the small diggers and the shady traders out of the acceptable stream of commerce. It also imposes costs (for tagging, monitoring and auditing) that make it even more difficult for new or smaller players to enter the global market.” (Spar, 2006)

Haufler (2009) proposes that the majority of industries targeted by advocacy groups in recent years are not as ideal for KPCS-type regulations because the diamond industry is more concentrated than other industries. Haufler supposes that benefits accrue to mining and retail jewelry companies in the diamond industry, but argues that these are peculiarities of the specific industry rather than a guide for future efforts. The literature on sanctions, including the most commonly cited theoretic model from Kaempher and Lowenberg (1992)³, also suggests that restrictions are more likely when there is industry support in the sending country due to local benefits from regulations.

If the KPCS were mostly beneficial for incumbent companies as some of these, and other scholars have argued, we should expect investors and other market participants to have re-evaluated companies in a positive light due to new information about the likelihood of

³ Please see Appendix A for a discussion of the Kaempher and Lowenberg (1992) model.

regulations. If the companies were publicly traded, we would also expect that the returns on securities of these companies would increase if there were good news about the prospects of the industry.

Using such an approach in another context however, La Ferrara and Guidolin (2007) show that in some cases, violent conflicts can benefit diamond mining companies. La Ferrara and Guidolin use micro-level data to demonstrate that the exogenous shock of the death of the rebel leader in Angola (and subsequent end of the conflict there) was interpreted as “bad news” for diamond mining companies with activities in the country, corresponding with a 4 per cent decrease in abnormal returns. The authors interpret this result as indicating that aspects of armed conflicts such as the weakening of state power and the increase in barriers to entry can benefit some stakeholders. Insofar as incumbent companies did in fact benefit from conflict situations, we should expect that credible regulations to ensure that diamonds produced in conflict environments do not reach markets would harm some mining interests.

Taking this debate as a starting point for the analysis of the effects of the near-global regulations on companies in the diamond industry, there are several critical questions that have not been conclusively answered in the literature:

- 1) Did the KPCS have real effects on the diamond industry?
- 2) If so, do events and policy decisions related to the KPCS continue to be relevant?
- 3) Again if the KPCS has measurable effects on the diamond industry, what was the direction of these effects and did the regulations benefit specific segments of the industry?

To anticipate the findings in this paper, I show that the development and implementation of the KPCS was viewed by stock market participants as having real impacts on the value of companies in the diamond industry. I also show that the majority of abnormal returns related to the creation of the KPCS were negative for mining companies globally. Moreover, I show that some retail jewelry companies appear to have been negatively impacted by events which called into question the credibility of the Process. These results suggest that the KPCS was expected to have real effects on mining companies that were not

unconditionally beneficial for them, and that regulation likely created incentives for retail jewelry companies to maintain the credibility of the Process.

I proceed as follows: Section 2 describes the event study methodology I employ. Section 3 describes the data I use in the analysis, and Section 4 describes the results. Having established that returns were indeed significantly abnormal, in Section 5 I turn to a discussion and interpretation of the main findings. Section 6 concludes.

2 Event Study Methodology

Event studies focus on “event windows” — the period of time during which investors learn about the event that is under study. In the following sections, I predict returns for securities during a given event window using estimates from an “estimation window” — an extended period prior to the event — using ordinary least squares regression. I then compare the predicted returns to actual returns to see the degree to which returns during the event window were abnormal in comparison the expected performance of the security.

The event study approach is based on the assumptions of the constant expected return model (CER)⁴ that, as a regression model, is expressed:

$$r_{it} = \mu_i + \epsilon_{it}, \quad (1)$$

$$\{\epsilon_{it}\}_{t=1}^T \sim GWN(0, \sigma_i^2)$$

$$\text{cov}(\epsilon_{it}, \epsilon_{js}) = \begin{cases} \sigma_{ij} & t = s \\ 0 & t \neq s \end{cases}$$

The term r_{it} is the return on security i at time t , and μ_i is expected return. The error term ϵ_{it} in the expression is a Gaussian white noise (GWN) process.

As applied to event studies, a common formulation of the regression model emphasizes the specific time period during which an event of interest took place, and that expected

⁴(a) *Covariance stationary and ergodicity*: $\{r_{i1}, \dots, r_{iT}\} = \{r_{it}\}_{t=1}^T$ is a covariance stationary and ergodic stochastic process with $E[r_{it}] = \mu_i$, $\text{var}(r_{it}) = \sigma_i^2$, $\text{cov}(r_{it}, r_{jt}) = \sigma_{ij}$, and $\text{cor}(r_{it}, r_{jt}) = \rho_{ij}$

(b) *Normality*: $r_{it} \sim N(\mu_i, \sigma_i^2)$ for all i and t

(c) *No serial correlation*: $\text{cov}(r_{it}, r_{js}) = \text{cor}(r_{it}, r_{js}) = 0$ for $t \neq s$ and $i, j = 1, \dots, N$.

returns are related to market-wide returns. The regression model can therefore be adapted to read:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \sum_{d=1}^{T_e} D_{itd} \gamma_{id} + \epsilon_{it}, \quad (2)$$

Where r_{it} is again the return on security i at time t and β_i is the systematic risk for security i . The term r_{mt} refers to the market return for the security exchange on which i trades, and ϵ_{it} is again a stochastic error term with a mean=0 and variance σ_i^2 . The dummy variable D_{itd} is equal to one during the event window and zero otherwise, and T_e is equal to the number of days of the event window. The term γ_{id} accounts for the difference between the actual return and the predicted return, which is usually referred to as the “abnormal return” in event studies.

In the following analysis, I look at an event window of several days because “news” or information about the value of a security does not circulate instantaneously for all market participants. The full effect of the event is a summation of the daily abnormal returns over the event window, which is referred to as the cumulative abnormal return or CAR :⁵

$$CAR_{ie} = \sum_{d=1}^{T_e} \hat{\gamma}_{id} \quad (3)$$

Under normal circumstances, the expected CAR should be equal to zero.⁶ A statistically significant shift away from expected returns however, signifies that new information has caused a re-evaluation:

$$H_0: \sum_{i:i \in N} CAR_{ie} = 0 \quad (4a)$$

$$H_A: \sum_{i:i \in N} CAR_{ie} \neq 0 \quad (4b)$$

⁵This is often expressed in the event study literature as simply the error term ϵ summed over the event window, rather than the defining the abnormal portion alongside a separate error term

⁶ Implied by (1) $\epsilon_{it} = r_{it} - \mu_i = r_{it} - E[r_{it}]$, the term ϵ_{it} is defined as the deviation of the random return from its expected value

Most trade restrictions do not affect all companies in the same way, as regulations could be beneficial for some firms (leading to a positive CAR) and harmful for others (leading to a negative CAR). The two types could be defined as those companies that would be expected to benefit from regulations ($i \in P$), and those that would be expected to be harmed ($i \in G$) by regulations. Rewriting the null and alternate hypotheses, the approach is expressed:

$$H_0: \sum_{i:i \in P} CAR_{ie} = 0 \quad (5a)$$

$$H_A: \sum_{i:i \in P} CAR_{ie} \begin{cases} > 0 \text{ if the event is positive} \\ < 0 \text{ if the event is negative} \end{cases} \quad (5b)$$

And:

$$H_0: \sum_{i:i \in G} CAR_{ie} = 0 \quad (6a)$$

$$H_A: \sum_{i:i \in G} CAR_{ie} \begin{cases} < 0 \text{ if the event is positive} \\ > 0 \text{ if the event is negative} \end{cases} \quad (6b)$$

As in (4a), both (6a) and (5a) state that the expected CAR = 0. But in this more explicit statement of the null and alternate hypotheses, the same event could characterize opposite impacts depending on the company type.

3 Data

The historical stock returns I use in the following analysis are publicly available. To compare performance, I pair stock returns with a national index from the country where the exchange is located. Table 1 lists the indices I use in the following analysis.

Table 1

Index	Symbol	% total
India Stocks Total Return Index	TRINDSTM	14.73
Dow Jones Canada Stock Index	_CA1	31.12
Dow Jones Australian Index	_DJAU	10.13
Dow Jones U.S. Total Stock Market Total Return Index (Full-Cap)	_DWCTD	14.53
Dow Jones Europe Stock Index (Excl UK)	_E23	7.6
Ftse-100 Value Stock Index	_FTUKXVD	6.06
Dow Jones Hong Kong Stock Index	_HK1	8.3
Dow Jones New Zealand Stock Index USD	_NZ2	1.45
Dow Jones Singapore Stock Index	_SG1	6.09

To select diamond mining companies to evaluate, I use a full list of active publically traded diamond mining companies listed by miningfeeds.com, a popular mining industry website. For retail jewelry companies, I use a list of publically traded companies on major global stock exchanges from Yahoo Finance on April 24, 2012.⁷

In some respects, companies that sell diamonds have similar interests to upstream firms, such as diamond mining companies. Although both company types take part in some trade groups and joint lobbying, their concerns are not always identical, and in the following analysis, I provide results for jewelry and mining firms separately.

The event dates included in the analysis through 2007 are based on a list created by diamondfacts.org, a website sponsored by the World Diamond Council (World Diamond Council, 2012). I supplement this list for dates after 2007 with important actions regarding the KPCS which were recorded in major newspapers and news services, including the *New York Times* and *Reuters*.⁸

4 Results

Below I list event dates with at least one event window showing significant abnormal returns. Although there are many ambiguous dates (where statistical significance depends on the length of the event window), several are clearly significant over both event window lengths and immediately stand out.

On the 5th of July, 2000, the UN Security Council imposed a worldwide ban on diamonds from Sierra Leone. Although fewer large-scale producers were involved in the primarily alluvial diamond mining operations present in Sierra Leone at that time, mining companies posted abnormally negative returns coinciding with the Security Council ban, and while smaller, the dip in returns for jewelry firms nears statistical significance over the three-day event window.

In the United States, the Act of Congress that brought the country into compliance with the KPCS was considered in several forms before a final version passed. The first version,

⁷ A full list of companies used in the following analysis is included in appendix B.

⁸ A full list of dates used in the following analysis is included in Appendix C.

H.R.1584, was proposed in the US House of Representatives on March 7th, 2001. The abnormal returns for diamond mining and jewelry companies during the event windows corresponding to this date were insignificantly different from zero. The introduction of a second version on April 3rd, 2003 similarly did not provoke a significant reaction in stock markets. When the Clean Diamonds Act passed in the US Senate on April 10th of 2003, however, returns on securities for diamond mining companies significantly declined over both the three- and five-day event windows. Likewise, when US President George W. Bush signed the Clean Diamond Trade Act⁹ into law on the 24th of April, 2003, and formally brought the United States into KPCS compliance, mining firms recorded statistically significant negative returns over both the three- and five-day event windows.

The UN Security Council banned diamonds from Côte d'Ivoire on the 15th of December, 2005, in response to violence in that country.¹⁰ Jewelry companies had abnormally negative returns over the three- and five-day event windows coinciding with this event, while mining companies showed no statistically significant change. When Ian Smillie, a leading conflict diamond expert and prominent designer of the KPCS, quit the Kimberley Process in a strongly worded letter on the 10th of June, 2009, mining companies appeared to have no statistically significant abnormal returns while jewelry companies recorded significantly negative returns over both event window lengths.

On the 10th of December, 2010, newspapers in Europe and North America first reported Wikileaks cables that detailed human rights violations in the Marange diamond fields in eastern Zimbabwe. Although diamond mining companies had no statistically significant change in returns around this time, jewelry companies again saw strongly negative returns over both event window lengths. A few months later on the 21st of March, 2011, the Democratic Republic of the Congo's chairperson Mathieu Yamba Lapfa Lambang unilaterally authorized diamond exports from Zimbabwe, despite vocal opposition from other members, including the US, EU and Canada. Jewelry companies had significantly positive returns

⁹ H.R. 1584 (108th)

¹⁰ Resolution 1643 (2005) Adopted by the Security Council at its 5327th meeting

during the windows coinciding with this event, while mining companies saw no statistically significant deviation from predicted returns.

Table 2

Jewelry Companies				
Event Date	Description	N	3-day	5-day
03-Oct-99	Major press release published	4	0.012 (0.010)	0.030 ** (0.008)
05-Jul-00	UNSC votes to impose world-wide ban on diamonds from Sierra Leone	8	-0.044 (0.025)	-0.035 (0.031)
16-Jul-00	29th World Diamond Congress meets the 16th to the 19th of July, creates World Diamond Council	8	0.036 (0.025)	0.006 (0.012)
04-Sep-00	A meeting of 50 delegates from all major diamond producing & importing countries	8	-0.054 (0.058)	-0.066 (0.059)
14-Feb-01	70 US-based NGOs launched the Campaign to Eliminate Conflict Diamonds	8	-0.034 (0.044)	-0.033 (0.046)
20-Feb-01	Israeli diamond banks issue notice to clients	8	0.054 ** (0.023)	0.049 ** (0.020)
11-Sep-01	Participant meeting in UK	8	-0.014 (0.012)	-0.039 * (0.019)
18-Mar-02	Kimberly Process meeting in Canada	10	-0.007 (0.040)	-0.043 (0.054)
13-Feb-03	UK diamond office opened	14	-0.025 * (0.013)	-0.027 * (0.013)
10-Apr-03	Senate Passes Clean Diamonds Act	24	0.014 (0.016)	0.014 (0.016)
24-Apr-03	Bush signs HR 1584, making US KP compliant	23	-0.036 (0.027)	-0.037 (0.027)
01-Jan-04	Canada Appointed chair of KP	25	0.001 (0.021)	-0.006 (0.021)
29-Oct-04	The participants of the Kimberley Process met in Plenary in Gatineau, Quebec	27	-0.021 * (0.010)	-0.023 * (0.012)
15-Dec-05	UNSC votes to impose global ban on Ivory Coast	28	-0.022 *** (0.006)	-0.022 *** (0.006)
10-Mar-06	Report on Brazil, claiming roughly half of diamond exports are not accounted for	29	-0.002 (0.007)	-0.003 (0.007)
22-May-07	The WDC accuses Zimbabwe and Venezuela for failing to cooperate with KPCS	31	-0.017 ** (0.007)	-0.009 (0.006)
10-Dec-08	The World Diamond Council (WDC) calls for crack down on Zimbabwe	39	0.008 (0.010)	0.025 ** (0.012)
16-Mar-09	High-level envoy visit by KP chair to Zimbabwe	38	-0.020 (0.019)	0.037 ** (0.017)
10-Jun-09	Ian Smillie quits Kimberley Process	40	-0.032 *** (0.012)	-0.050 *** (0.014)
03-Jun-10	Arrest of Farai Maguwu for investigating human rights violations	41	0.017 * (0.009)	0.014 (0.009)
10-Dec-10	Wikileaks information on atrocities in Zimbabwe fields reported	43	-0.034 *** (0.011)	-0.023 * (0.013)
21-Mar-11	Mathieu Lapfa unilaterally authorizes Zimbabwe exports	43	0.013 * (0.006)	0.023 * (0.012)

***p<0.01, **p<0.05, *p<0.1, (Robust Standard Errors)

Table 3

Mining Companies				
Event Date	description	N	3-day	5-day
03-Oct-99	Major press release published	12	0.056 (0.057)	0.099 (0.068)
05-Jul-00	UNSC votes to impose world-wide ban on diamonds from Sierra Leone	12	-0.069 *** (0.021)	-0.097 *** (0.027)
16-Jul-00	29th World Diamond Congress creates World Diamond Council	13	-0.024 * (0.013)	-0.018 (0.035)
04-Sep-00	A meeting of 50 delegates from all major diamond producing & importing countries	13	-0.020 (0.013)	-0.053 ** (0.019)
14-Feb-01	70 US-based NGOs launched the Campaign to Eliminate Conflict Diamonds	13	0.052 * (0.025)	0.049 (0.027)
20-Feb-01	Israeli diamond banks issue notice to clients	13	-0.033 (0.034)	-0.037 (0.025)
11-Sep-01	Participant meeting in UK	14	0.008 (0.018)	-0.048 (0.033)
18-Mar-02	Kimberly Process meeting in Canada	14	0.003 (0.022)	-0.036 * (0.019)
13-Feb-03	UK diamond office opened	15	0.072 (0.062)	0.064 (0.063)
10-Apr-03	Senate Passes Clean Diamonds Act	18	-0.020 * (0.011)	-0.027 * (0.016)
24-Apr-03	Bush signs HR 1584, making US KP compliant	18	-0.030 * (0.016)	-0.036 * (0.017)
01-Jan-04	Canada Appointed chair of KP	18	-0.026 (0.018)	-0.033 * (0.017)
29-Oct-04	The participants of the Kimberley Process met in Plenary in Gatineau, Quebec	19	-0.016 (0.014)	-0.002 (0.015)
15-Dec-05	UNSC votes to impose global ban on Ivory Coast	19	-0.015 (0.014)	-0.016 (0.014)
10-Mar-06	Report on Brazil, claiming roughly half of diamond exports are not accounted for	19	-0.025 (0.014)	-0.043 ** (0.019)
22-May-07	The WDC accuses Zimbabwe and Venezuela for failing to cooperate with KPCS	22	-0.014 (0.014)	-0.017 (0.020)
10-Dec-08	The World Diamond Council (WDC) calls for crack down on Zimbabwe	27	0.069 (0.044)	0.022 (0.044)
16-Mar-09	High-level envoy visit by KP chair to Zimbabwe	27	-0.039 (0.063)	-0.023 (0.055)
10-Jun-09	Ian Smillie quits Kimberley Process	27	0.043 (0.038)	0.048 (0.043)
03-Jun-10	Arrest of Farai Maguwu for investigating human rights violations	27	-0.018 (0.021)	-0.035 (0.026)
10-Dec-10	Wikileaks information on atrocities in Zimbabwe fields reported	27	-0.005 (0.013)	0.009 (0.020)
21-Mar-11	Mathieu Lapfa unilaterally authorizes Zimbabwe exports	30	0.002 (0.010)	0.012 (0.018)

***p<0.01, **p<0.05, *p<0.1, (Robust Standard Errors)

5 Analysis

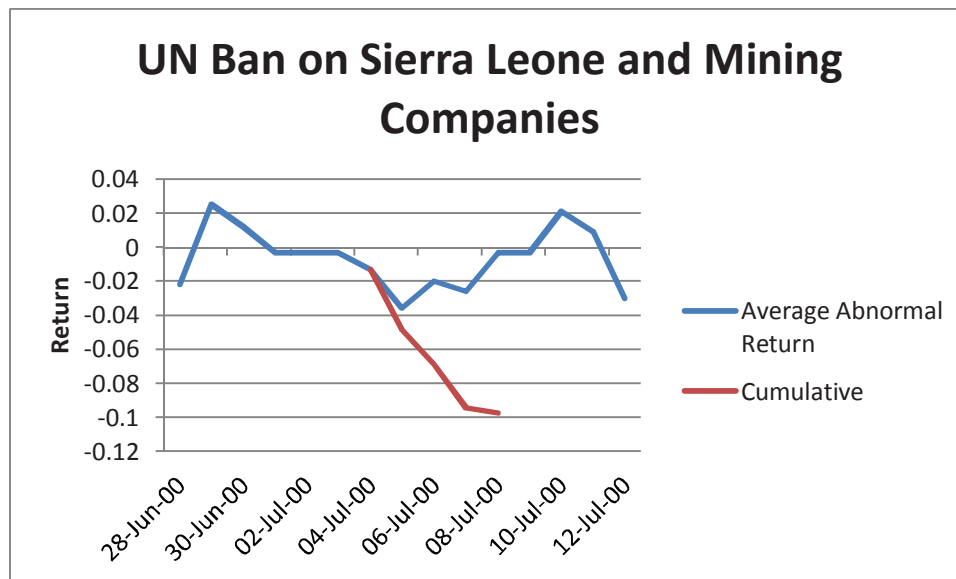
None of the statistically significant events studied in this analysis affected both jewelry and diamond mining companies at the same time and in the same direction, which suggests that the interests of the two company types with respect to regulations and markets were more separate over the issues investigated here than expected.

The events that most affected diamond mining companies appear to be related to regulations at the national or UN-level.¹¹ Both the Security Council decision to ban diamonds exported from Sierra Leone and the events corresponding to US ratification of KPCS-compliant legislation drove down returns for diamond mining companies. Over the three-day event window for the ban on Sierra Leone, cumulative returns for mining companies were nearly 7% below expected performance, and nearly 9% below over the five-day window. Passage of the Act from the US Senate corresponded with a 2.4% lower than expected return over the three-day window, 2.7% over the five-day window. Final US ratification corresponded with returns that were 3.2% lower than expected over a three-day window and 3.8% lower than expected over the five-day window.

These results suggest that overall the KPCS was not expected to help diamond mining companies, as some analysts suggest. This does not preclude the possibility that protection from competition benefited some firms in some respects, but as a whole the regulations were not looked as “good news” for diamond mining companies.

¹¹ One event that may coincide with a report on the failure of the KPCS in Brazil approaches significance over the 3-day window and is significant over the 5-day window. The results are in large part driven by a single company however, Mountain Lake Resources Inc., which did not have any diamond production in Brazil.

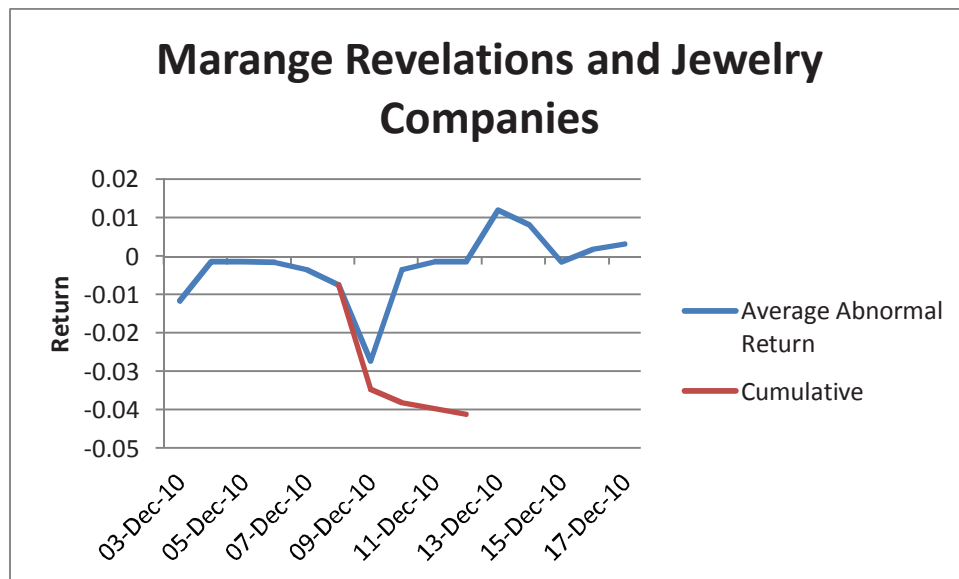
Figure 1



This result could arise due to several factors, or a combination of them. The KPCS regulations could entail a high cost of implementation, and the laws could have been expected to place higher cost on firms operating in developed countries (which are more likely to be traded on exchanges) than in less-developed economies. Another possibility is that some diamond mining companies did well by operating in the circumstances surrounding armed conflicts, as La Ferrara and Guidolin (2007) suggest was the case in Angola.

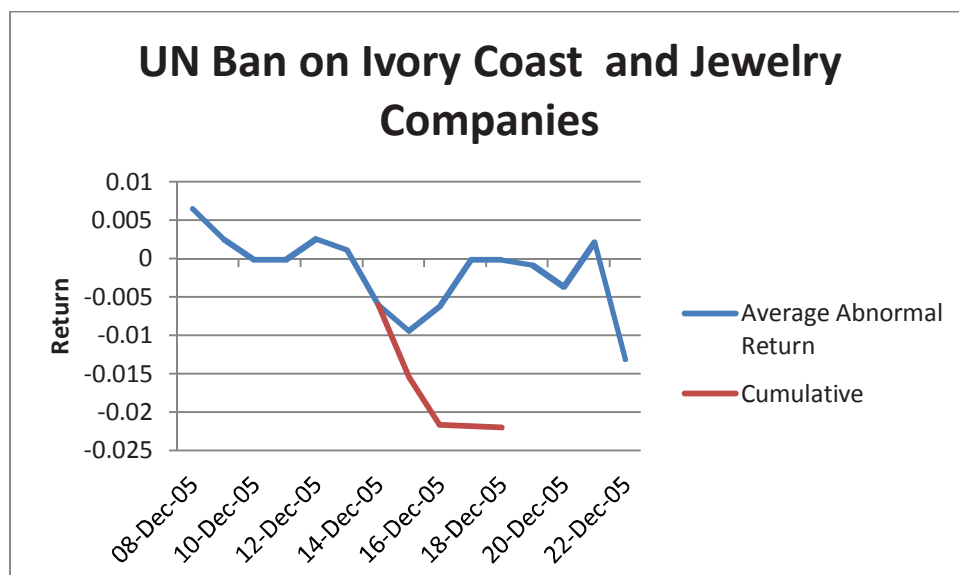
Retail jewelry companies however were more sensitive to events that could impact the retail demand for diamonds. Although not all such events were significant for jewelry companies, those events that were significant and positive were most often those that supported the credibility of the KPCS, whereas those which were negative undermined that credibility. For example, when Ian Smillie left the KPCS, jewelry retail companies experienced significantly lower than expected returns. Likewise, when Wikileaks cables revealed that diamonds that were certified as conflict-free had in fact been sourced in an area experiencing armed conflict, jewelry retailers again experienced lower than expected returns. These are the results one would expect were jewelry companies expected to benefit more from a KPCS program that was seen as credible as otherwise.

Figure 2



Other cases which seemed to benefit jewelry retail companies were events which opened competition in the market for diamond production and vice versa. When the UN Security Council banned diamonds from Côte d'Ivoire, returns were abnormally low for jewelry retailers, perhaps reflecting the reduction of competition in diamond production.

Figure 3



When Mathieu Yamba Lapfa Lambang, Chair of the KPCS in 2011, unilaterally opened up Zimbabwe diamond exports, jewelry retailers appear to have benefited from this unanticipated event. Both over the shorter and longer event windows, abnormal returns were positive and statistically significant. This may reflect the increased bargaining power retailers were expected to have with more producers entering the market.

6 Conclusion

For mining companies, the most influential dates on returns related to governmental and regulatory actions in the early 2000s from both the UN and US. Trade restrictions on diamonds appear to have negatively affected mining firms in ways not felt in the rest of the diamond industry. After 2004, jewelry companies, a group that in general is much closer to end consumers on the supply chain, felt the effects of KPCS-related events much more than mining firms, which appear hardly affected by KPCS-related events during this time. This may indicate that the more image-driven portion of the market was more sensitive to the perceptions of consumers surrounding the KPCS and its implementation.

The results also indicate that although diamond-mining companies appear less likely to be affected by KPCS-related events, jewelry companies experienced statistically significant abnormal returns as recently as 2011. Although the KPCS has been criticized as no longer significant, it appears that in some circumstances the organization's reputation and decisions matter for companies in the industry.

Mining and jewelry firms worked together to form the World Diamond Council and other bodies during the initial implementation of KPCS rules, and the two company types were represented in KPCS proceedings thereafter. This analysis shows, however, that the interests of the two company types are not always, or even usually, coincidental. Although there are no examples reported here where abnormal returns for jewelry firms can be shown to significantly move in the opposite direction as those of diamond mining companies, there were no examples of significantly positive (or negative) abnormal returns for both company types at the same time.

7 Bibliography

- Baldwin, D. (1985). *Economic Statecraft*. Princeton, NJ: Princeton University Press.
- Barber, J. (1979). Economic Sanctions as a Policy Instrument. *International Affairs*, 367-384.
- Billon, P. L. (2001). The political ecology of war: natural resources and armed conflicts. *Political Geography*, 561–584.
- Chan, S. a. (2000). *Sanctions as Economic Statecraft: Theory and Practice*. London: Macmillan.
- Collier, P., & Hoeffler, A. (2004). Greed and Grievance in Civil War. *Oxford Economic Papers*.
- Cortright, D. a. (2000). *The Sanctions Decade: Assessing UN Strategies in the 1990s*. Boulder: Lynne Rienner.
- Cortright, D. a. (2002). *Sanctions and the Search for Security: Challenges to UN Action*. Boulder: Lynne
- Deaton, A. (1999). Commodity Prices and Growth in Africa. *The Journal of Economic Perspectives*, 23-40.
- Doxey, M. P. (1980). *Economic Sanctions and International Enforcement*. London: Oxford University Press.
- Doxey, M. P. (1980). *International Sanctions in Contemporary Perspective*. London: Oxford University Press.
- Fearon, J. D. (2003). Ethnicity, Insurgency, and Civil War. *American Political Science Review*.
- Gary Clyde Hufbauer, J. S. (1985). *Economic Sanctions Reconsidered: History and Current Policy*. Washington D.C.: Institute for International Economics.
- Green, J. (1983). Strategies for Evading Economic Sanctions. In M. a. Nincic, *Dilemmas of Economic Coercion: Sanctions in World Politics* (pp. 61-85). New York: Praeger.
- Guidolin, M., & La Ferrara, E. (2007). Diamonds Are Forever, Wars Are Not: Is Conflict Bad for Private Firms? *The American Economic Review*, 1978-1993.
- Gylfason, T., & Zoega, G. (2002). Inequality and Economic Growth: Do Natural Resources Matter? *CESifo Working Paper Series*.
- Haufler, V. (2009). Sanctions and Private Self-Regulation. *APSA 2009 Toronto Meeting Paper* , 1-16.
- Hufbauer, G. &. (1985). *Economic Sanctions Reconsidered History and Current Policy*. Washington, DC: Institute for International Economics.

- Hufbauer, G., & Elliott, J. S. (1990). *Economic Sanctions Reconsidered: History and Current Policy*. Washington, DC: Institute for International Economics.
- Hufbauer, G., & Elliott, J. S. (1990). *Economic Sanctions Reconsidered: Supplemental Case Histories*. Washington, DC: Institute for International Economics.
- Kaempfer, W. H. (1987). Divestment, Investment Sanctions, and Disinvestment: An Evaluation of Anti-Apartheid Policy Instruments. *International Organization*, 457-73.
- Kaempfer, W., & Lowenberg, A. (1992). *International Economic Sanctions: A Public Choice Perspective*. Boulder: Westview Press.
- Keohane, R. O. (1977). *Power and Interdependence: World Politics in Transition*. Boston, MA: Brown & Company.
- Kimberley Process. (2012, 06 13). *KP Basics*. Retrieved from <http://www.kimberleyprocess.com>: <http://www.kimberleyprocess.com/web/kimberley-process/kp-basics>
- Kirshner, J. (1997). The Microfoundations of Economic Sanctions. *Security Studies*, 32–64.
- Knorr, K. (1975). *The Power of Nations: The Political Economy of International Relations*. New York: Basic Books.
- La Ferrara, E., & Della Vigna, S. (2010). Detecting Illegal Arms Trade. *American Economic Journal: Economic Policy*, 26-57.
- Lektzian, D., & Souva, M. (2007). An Institutional Theory of Sanctions Onset and Success. *Journal of Conflict Resolution*, 848-869.
- Lundborg, P. (1987). *The Economics of Export Embargoes: The Case of the US-Soviet Grain Suspension*. London: Croom Helm.
- Martin, L. L. (1992). *Coercive Cooperation: Explaining Multilateral Economic Sanctions*. Princeton, NJ: Princeton University Press.
- Massimo, G., & La Ferrara, E. (2007). Diamonds Are Forever, Wars Are Not: Is Conflict Bad for Private Firms? *The American Economic Review*, 1978-1993.
- Morgan, T. C. (1995). Clinton's Chinese Puzzle: Domestic Politics and the Effectiveness of Economic Sanctions. *Issues and Studies*, 19-45.
- Morgan, T. C. (1997). Fools Suffer Gladly: The Use of Economic Sanctions in International Crises. *International Studies Quarterly*, 27-50.
- Nincic, M. &. (1983). *Dilemmas of Economic Coercion: Sanctions in World Politics*. New York: Praeger.

- Nossal, K. R. (1989). International Sanctions as International Punishment. *International Organization*, 301-322.
- Pape, R. A. (1997). Why Economic Sanctions Do Not Work. *International Security*, 90-136.
- Rodman, K. A. (1995). Sanctions at Bay? Hegemonic Decline, Multinational Corporations, and the US Economic Sanctions Since the Pipeline Case. *International Organization*, 105-138.
- Spar, D. L. (2006). Markets: Continuity and Change in the International Diamond Market. *Journal of Economic Perspectives*, 195–208.
- UN Panel of Experts. (2000). *Report of the Panel of Experts on Violations of Security Council Sanctions Against UNITA*. United Nations Security Council.
- World Diamond Council. (2012, 06 13). *Facts*. Retrieved from <http://diamondfacts.org>:
http://diamondfacts.org/index.php?option=com_content&view=article&id=107&Itemid=150&lang=en
- World Diamond Council. (2012, 06 13). *Facts*. Retrieved from <http://diamondfacts.org>:
http://diamondfacts.org/index.php?option=com_content&view=article&id=107&Itemid=150&lang=en
- Wright, C. (Winter 2004). Tackling Conflict Diamonds: The Kimberley Process Certification Scheme. *International Peacekeeping*, Vol.11, No.4, , 697–708.

8.1 Appendix A: Interest Groups and the Kaempher and Lowenberg model

In the Kaempher and Lowenberg (1992) model, interest groups are formed based upon common interests, describing the perspective of a group as a single utility-maximizing unit (Kaempfer, 1987). Individual i is a member of population I and maximizes utility according to:

$$\begin{aligned} \max U^i &= U^i(Y^i, S), \text{ where } U_1^i > 0, \text{ and } U_{11}^i < 0 \\ \text{subject to } Y^i &= Y^i(S), \text{ and } Y^i(0) = E^i \end{aligned}$$

Income for individual i as Y^i , and E^i as the individual's initial endowment. The term S is a non-negative and continuous variable which describes the level of sanctions that are applied to another state or group of economic actors. The model assumes that individuals maximize utility, which is a function of their income, but also a function of sanctions.

Splitting the population into three types $I = \{J, K, L\}$, and considering representatives of each of these groups ($j, k, l \in J, K, L$), each member has a different reaction to the costs of sanctions. Let $Y_1^j > 0$, $Y_1^k < 0$ and $Y_1^l = 0$ so that for j income increases with sanctions against another country, for k income decreases with sanctions against another country, and for l income is unaffected.

Because the J 's and the K 's will be competing against one another, they will be willing to pay for additional sanctions in the bargaining process, up until the point that paying more will leave them with less utility than the sanction being implemented (or not implemented):

$$\begin{aligned} P_s &= D^j(S) = \sum_j \partial U^j / \partial s \\ &= \sum_j U_1^j \cdot Y_1^j, \quad D_1^j < 0 \end{aligned}$$

And

$$\begin{aligned} P_s &= D^k(S) = - \sum_k \partial U^k / \partial s \\ &= - \sum_k U_1^k \cdot Y_1^k, \quad D_1^k > 0 \end{aligned}$$

Equating the two clears the political market for sanctions if, by assumption, there are no deadweight losses in the initial bargaining process,¹² and for small changes around $S = 0$ the marginal utilities of all individuals, regardless of their groups, are identical. The term P_S is the unit price of sanctions, which are relevant to both the J 's and the K 's. The J 's are willing to pay some price to have sanctions put into place, and the K 's are willing to pay some price to keep sanctions from increasing.¹³ The market for sanctions then depends on the degree to which the individuals of each group are willing to “pay” in their support of or opposition to sanctions.

Crucially, group L can shift the equilibrium point, and has more utility in the case that sanctions are put in place but not due to income effects. This implies that alliances between L s (such as NGOs), and J s (such as un-sanctioned firms) could overwhelm sanction detractors or targets, causing redistribution away from the no sanction equilibrium and towards benefiting non-sanctioned producers.

¹² Meaning that the sum of all incomes is exactly the same regardless of bargaining outcome

¹³ To consider free riding problems we could include: Another feature of this type of competition is free riding, as everybody of the same type has an incentive to signal a lower willingness to pay than they actually have.

$P_S = j(S, E^J), J_1 < 0, J_2 < 0$; $P_S = K(S, E^K), K_1 < 0, K_2 < 0$

E^J And E^K are shift parameters which are meant to reflect the free riding that will occur in both of the groups.

8.2 Appendix B

Firms		
Company	ticker	Index
Stornoway Diamond Corp.	SWY.TO	_CA1
BHP Billiton plc	BLT.L	_FTUKXVD
Rio Tinto Ltd.	RIO.AX	_DJAU
Anglo American plc	AAL.L	_FTUKXVD
Harry Winston Diamond Corp.	HW.TO	_CA1
Mountain Province Diamonds Inc.	MPV.TO	_CA1
Lucara Diamond Corp.	LUCRF.PK	_DWCTD
Gem Diamonds Limited	GEMD.L	_FTUKXVD
Shore Gold Inc.	SGF.TO	_CA1
Peregrine Diamonds Ltd.	PGD.TO	_CA1
Firestone Diamonds plc	FRDIF.PK	_DWCTD
Northern Superior Resources Inc.	SUP.V	_CA1
Olivut Resources Ltd.	OLV.V	_CA1
Mwana Africa PLC	MWNAF.PK	_DWCTD
Williams Creek Gold Limited	WCX.V	_CA1
Tawana Resources NL	TAW.AX	_DJAU
North Australian Diamonds Ltd.	NAD.AX	_DJAU
Metalex Ventures Ltd.	MTX.V	_CA1
Tsodilo Resources Ltd.	TSD.V	_CA1
Diamcor Mining Inc.	DMI.V	_CA1
Vaaldiam Mining Inc.	VAA.TO	_CA1
Rimfire Pacific Mining NL	RIM.AX	_DJAU
Integra Gold Corp.	KALRF.PK	_DWCTD
Rockwell Diamonds Inc.	RDI.TO	_CA1
True North Gems Inc.	TGX.V	_CA1
Paramount Mining Corp.	PCP.AX	_DJAU

Firms Continued

Company	ticker	Index
Lonrho Mining Limited	LOM.AX	_DJAU
Mountain Lake Resources Inc.	MOA.V	_CA1
Venus Metals Corp. Limited	VMC.AX	_DJAU
Shear Diamonds Ltd.	SRM.V	_CA1
Aspial Corporation Limited	A30.SI	_SG1
Birks & Mayors Inc.	BMJ	_DWCTD
Blue Nile Inc.	NILE	_DWCTD
Cash Converters	CCVU.L	_FTUKXVD
Charles & Colvard Ltd.	CTHR	_DWCTD
Chow Sang Sang Holdings	0116.HK	_HK1
Christian Dior SA	CDI.PA	_E23
Coach, Inc.	COY.BE	_E23
Compagnie Financiere	RITB.DE	_E23
Continental Holdings Ltd.	0513.HK	_HK1
Cortina Holdings Limited	C41.SI	_SG1
Damiani	DMN.MI	_E23
DGSE Companies Inc.	DGSE	_DWCTD
Dickson Concepts	0113.HK	_HK1
Emperor Watch & Jewellery	0887.HK	_HK1
Fuqi International, Inc.	3F6A.DE	_E23
Gems TV Holdings Limited	AM3.SI	_SG1
Gitanjali Gems Ltd.	GITANJALI.BO	TRINDSTM
Goldiam International Ltd.	GOLDIAM.NS	TRINDSTM
Hermes International	RMS.PA	_E23
Hour Glass Limited	E5P.SI	_SG1
Joyas International	E9L.SI	_SG1

Firms Continued

Company	ticker	Index
Larry Jewelry	8351.HK	_HK1
Laser Diamonds Ltd	LADIAMO.BO	TRINDSTM
LVMH Moet Hennessy Louis	LVMH.MI	_E23
Michael Hill Interna	MHI.NZ	_NZ2
Ming Fung Jewellery Group Ltd.	0860.HK	_HK1
Noble Jewelry Holdings Ltd.	0475.HK	_HK1
Nuvel Holdings, Inc.	NUVL.OB	_DWCTD
Parekh Platinum Ltd.	PAREKHPLA.NS	TRINDSTM
PPR	PP.MI	_E23
Rajesh Exports Ltd.	RAJESHEXP.NS	TRINDSTM
RCG Corporation Limited	RCG.AX	_DJAU
Renaissance Jewellery Ltd.	RJL.BO	TRINDSTM
Second Chance Properties	528.SI	_SG1
Shrenuj & Company Ltd.	SHRENUJ.NS	TRINDSTM
Signet Jewelers Limited	SIG	_DWCTD
Suashish Diamonds Ltd.	SUASHDIM.BO	TRINDSTM
Sunraj Diamond Exports Ltd.	SUNRAJDI.BO	TRINDSTM
Surana Corporation Ltd	SURANACOR.NS	TRINDSTM
Swarnsarita Gems Ltd	SHYAMST.BO	TRINDSTM
Thangamayil Jewellery Ltd	THANGAMAY.NS	TRINDSTM
Tiffany & Co.	TIF	_DWCTD
Titan Industries Ltd.	TITAN.BO	TRINDSTM
Tse Sui Luen Jewellery	0417.HK	_HK1
Vaibhav Gems Ltd.	VAIBHAVG.BO	TRINDSTM
Zale Corporation	ZLC	_DWCTD

8.3 Appendix C

Full Candidate Event List	
Event Description	Event Date
Major press release published	03-Oct-99
First meeting to organize KP	11-May-00
UN Security Council votes to impose world-wide ban on diamonds from Sierra Leone	05-Jul-00
29th World Diamond Congress meets , creates World Diamond Council	16-Jul-00
A meeting of over 50 delegates	04-Sep-00
First meeting of the WDC, mandate to curtail conflict diamonds	07-Sep-00
Seventy US-based NGOs launch the Campaign to Eliminate Conflict Diamonds	14-Feb-01
Israeli diamond banks issue notice to clients	20-Feb-01
First Version of Clean Diamonds Act	07-Mar-01
Kimberley Process intergovernmental group meets	25-Apr-01
UN Resolution 1343 Regarding Liberia automatically goes into effect	07-May-01
Participants meet in Moscow, propose minimum standarts	03-Jul-01
Participant meeting in UK	11-Sep-01
Participants meet in Luanda, Angola	30-Oct-01
Kimberley Process meets in Gaborone, Botswana, agree to minimum standards	26-Nov-01
WDC adopts system of warranties in Milan	13-Mar-02
Kimberly Process meeting in Canada	18-Mar-02

Full Candidate Event List Continued

Event Description	Event Date
European Commission releases 1st draft of Council regulation on implementing KPCS	18-Jul-02
Adoption the international certification scheme	04-Nov-02
KPCS enters force, US and UK issued grace period; South Africa appointed chair of KP	01-Jan-03
UK diamond office opened	13-Feb-03
Second Version of Clean Diamonds Act	03-Apr-03
Senate Passes Clean Diamonds Act	10-Apr-03
Bush signs HR 1584, making USA KP compliant	24-Apr-03
The Kimberley Process convened for a plenary meeting in Johannesburg	30-Apr-03
full implementation, only compliant countries can trade with one another	01-May-03
UN lifts restriction on exports of diamonds from Sierra Leone	04-Jun-03
Monitoring meeting	20-Oct-03
Canada Appointed chair of KP	01-Jan-04
Republic of Congo Suspended	09-Jul-04
The participants of the Kimberley Process meet in Gatineau, Quebec	29-Oct-04
Russia appointed chair	01-Jan-05
Ivory Coast suspended	17-Nov-05

Full Candidate Event List Continued

Event Description	Event Date
UN Security Council votes to impose world-wide ban on diamonds from Ivory Coast	15-Dec-05
Botswana assumes chair	01-Jan-06
Report on Brazil, claiming roughly half of diamond exports are not accounted for	10-Mar-06
The WDC accuses Zimbabwe and Venezuela of failing to cooperate with the KP	22-May-07
The WDC calls for cracking down on the trade of illegal diamonds from Zimbabwe	10-Dec-08
KP chair visits Zimbabwe	16-Mar-09
Ian Smillie quits Kimberley Process	10-Jun-09
Zimbabwe reported as set to receive approval	28-May-10
Farai Maguwu, human rights violations investigator, arrested in Zimbabwe	03-Jun-10
Farai Maguwu freed	12-Jul-10
Meeting in St. Petersburg allows sales of diamonds from Marange, Zimbabwe	15-Jul-10
Zimbabwe began selling diamonds mined from an area where soldiers are accused of human rights violations	11-Aug-10
Second public diamond auction in Zimbabwe	11-Sep-10
Wikileaks information on atrocities in Zimbabwe fields reported	10-Dec-10
Mathieu Lapfa unilaterally authorizes Zimbabwe exports	21-Mar-11
Global Witness pulls out of KPCS	05-Dec-11