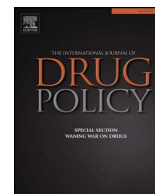




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Comparing cryptomarkets for drugs. A characterisation of sellers and buyers over time

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ABSTRACT

Introduction: Cryptomarkets operating on the darknet are a recent phenomenon that has gained importance only over the last couple of years (Barratt, 2012). However, they now constitute an evolving part of illicit drug markets. Although selling and buying a variety of psychoactive substances on the Internet has a long history, new technological developments enable systematic drug trading on the net. These technological innovations on the Internet allow users to proceed with (illicit) drug transactions with almost completely anonymous identities and locations. In this paper, we provide a systematic measurement analysis of structures and trends on the most popular anonymous drug marketplace, and discuss the role of cryptomarkets in drug distribution.

Methods: Data collection and analysis include a long-term measurement of the cryptomarket ‘AlphaBay’, the most popular platform during the survey period. By developing and applying a web-scraping tool, market data was extracted from the marketplace on a daily basis during a period of twelve months between September 2015 and August 2016. The data was analysed by using business-intelligence software, which allows the linking of various data sets. We found 2188 unique vendors offering 11,925 drug items. The findings of our long-term monitoring and data analysis are compared over time and across marketplaces, offering a detailed understanding of the development of revenues generated, characterisation of countries of origin and destination, and distribution of vendors and customers over time.

Results: We provide a nuanced and highly detailed longitudinal analysis of drug trading on the darknet marketplace ‘AlphaBay’, which was the largest cryptomarket in operation. 1) Total sales volumes for the ‘drugs’ section was estimated at approximately USD 94 million for the period from September 2015 to August 2016. 2) In addition, about 64% of all sales are made with cocaine-, cannabis-, heroin-, and ecstasy-related products. 3) Average selling prices increase over time for categories including cannabis and hashish, ecstasy, opioids, psychedelics and stimulants. 4) The five most frequent countries of origin as indicated by vendors are the United States, United Kingdom, Australia, the Netherlands and Germany. Moreover, it was demonstrated that drug distribution on cryptomarkets is conducted at a regional rather than global level. 6) Furthermore, 4.88% of vendors made over USD 200,000 and were responsible for 52.9% of total revenues generated over the period analysed. In contrast, 57.51% of vendors managed to sell drug items worth less than USD 10,000 within a period of twelve months. The findings suggest that ‘AlphaBay’ was a cryptomarket mainly from and for Western industrialised countries. In contrast, countries of the global South are neither among the main countries of origin nor destination countries.

Supply and demand on cryptomarkets

Though buying and selling drugs on the Internet go hand in hand with the rise of the Internet, the phenomenon of anonymous marketplaces¹ for, among other things, licit and illicit drugs has gained importance since the first platform ‘Silk Road’ went online in 2011

(Buxton & Bingham, 2015). On ‘Silk Road’, a set of technological innovations enabled, for the first time, systematic drug trading on the net (Barratt, Ferris, & Winstock, 2014; Martin, 2014a). These technologies include anonymising software (e.g. Tor) for communication purposes and virtual currencies such as Bitcoin to facilitate the trade of goods and services. The products ordered on the Internet are delivered by

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¹ The terms anonymous drug marketplaces, cryptomarkets and darknet drug markets are used interchangeably and refer to the phenomenon of platforms for, among other things, licit and illicit psychoactive substances which can be accessed by using anonymising software such as Tor (short for The Onion Router).

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traditional postal services without their knowledge. By combining these technologies, illicit drug transactions proceed without any face-to-face meeting, and identities and locations remain anonymous. Thus, while cryptomarkets are easily accessible for users, they are very difficult for law enforcement agencies to shut down. In this regard, the technological innovation used on anonymous online drugs platforms can be seen as a trade-off between “possibility of freedom and necessity of control” (Jasanoff, 2004: 14).

Irrespective of current drug policy, internet technology facilitates an increasing global availability of a wide range of both controlled and new psychoactive substances (Trautmann, 2013). Moreover, supply and demand serve to self-regulate through informal social norms, conventions, values, and cultural beliefs, which have fuelled the growth of a global drug market on an unprecedented scale. User-friendly interfaces and features offered on drug platforms are similar to those provided by e-commerce companies on the World Wide Web, such as customer feedback systems that allow customers to rate sellers and review products. At the same time, customer feedback helps to build trust between sellers and buyers that do not know each other (Bakken, Møller, & Sandberg, 2017; Tzanetakis, Kamphausen, Wese, & von Laufenberg, 2016). Furthermore, different payment systems are offered on these anonymous platforms which allow for dispute resolution, e.g., by a third party (such as the moderators), in case of conflict (Tzanetakis, 2015).

The original platform ‘Silk Road’ had a monopoly position offering a wide range of psychoactive substances by vendors for selling, but also pornographic material, and false documents like fake ID cards and driving licenses (Christin, 2013). At the beginning weapons were traded as well, though these were later moved to a separate platform. Since ‘Silk Road’ started operating in 2011, the majority of anonymous drug marketplaces have strictly rejected the use of the platforms for exchanging pornographic content involving children (Martin, 2014a). ‘Silk Road’ attracted a lot of attention from the media, government authorities and law enforcement, as well as the increased interest of scholars, which persisted when the platform was shut down by the FBI in 2013. Since then, numerous new platforms have opened, some closing voluntarily and others being taken down by law enforcement or ceasing operation after having scammed the sellers and customers (Tzanetakis & Stöver, in press). As of October 2017, almost two dozen platforms of varying sizes and feature sets are online (Darknet Stats, 2017). Customers can choose between various marketplaces and vendors, indicating a high level of competition between vendors and between platforms.

In a qualitative study, Van Hout and Bingham (2013a) explore purchasing practices, experiences and motives of users of the initial market ‘Silk Road’ and found that the relationship between vendors and customers is shaped by trust and professionalism. In a visual and narrative analysis of users’ motives, Van Hout and Bingham (2013b) conclude that the majority of users are male, have a history of drug use ranging from 18 months to 25 years, and are in professional employment or tertiary education. Moreover, Barratt et al. (2014) who conducted the first anonymous online survey among 9470 users from English-speaking countries found that drug purchases were made on ‘Silk Road’ because it offered a wider range of drugs, better quality and greater convenience than was usually available offline. Bancroft and Reid (2016) use discussions on a market forum and qualitative interviews to explore how drug quality is assessed by its users and how experiences of purity, dosing, effects and vendors are systematically shared. In contrast, Caudevilla et al. (2016) reported on the content and purity of drugs based on 219 samples tested in a laboratory. They found that 91.3% of the test results matched the advertised substance online and most samples were of high purity. Barratt and Maddox (2016) conducted digital ethnography to describe how the consumption behaviour of users changed due to the high availability of drugs on the darknet. Participants described a peak of drug consumption in the initial months of using ‘Silk Road’ and no longer needing to hoard drugs

due to the high availability of drugs on cryptomarkets, which helped some to moderate their drug use. In addition, Martin (2014b) was the first to discuss the possibility of cryptomarkets reducing violence. In an international survey, Barratt, Ferris, and Winstock (2016) found that cryptomarkets may reduce drug market-related violence compared to face-to-face drug buying.

Moreover, a qualitative study exploring vendors’ accounts of ‘Silk Road 1’ concluded that sellers adopted a professional approach to running their businesses on the marketplace, providing quality service to maximise their profits, advertising of quality products, professional communication and regular forum activity, competitive pricing, good stealth techniques, speedy dispatch of slightly overweight products, and efforts to avoid customer disputes (Van Hout & Bingham, 2014). By using larger datasets, Décary-Héту, Paquet-Clouston, and Aldridge (2016) demonstrate that the majority of vendors on ‘Silk Road 1’ were willing to take the risk of shipping drugs internationally. The recent scholarship demonstrate the relevance of cryptomarkets by contributing to an overview of supply and demand on anonymous online markets.

In contrast to material drug markets, cryptomarkets allow the collection and analysis of ‘publicly available’ market data regarding revenues generated, drug listings offered, quantities, self-reported countries of origin and destination countries, and distribution of average price. Only these data are available on cryptomarkets because the physical identities and locations of the participants involved in trading are concealed by technological means. However, this novel possibility for conducting measurement analyses has been taken up by some scholars including Aldridge and Décary-Héту, 2014 Décary-Héту (2014,2016, Christin (2013), Cunliffe, Martin, Décary-Héту, and Aldridge (2017), Demant, Munksgaard, and Houborg (2016), Kruithof et al. (2016), Soska and Christin (2015).

While most scholarly contributions provide data on the initial marketplace ‘Silk Road’ (Aldridge & Décary-Héту, 2016; Christin, 2013; Soska & Christin, 2015), which was in operation between 2011 and 2013, this paper will present more recent drug market trends by conducting a long term measurement analysis on the cryptomarket ‘AlphaBay’ between September 2015 and August 2016. The paper aims to (1) provide a systematic measurement and analysis of patterns and trends of online drug marketplaces; (2) compare drug-related activities on the platform ‘AlphaBay’ across various marketplaces and over time; and (3) discusses the role of online drug markets in drug distribution.

The remainder of the paper is organized as follows. Following an introduction into the novel phenomenon and a review of literature regarding supply and demand on cryptomarkets, the measurement methodology is discussed in Section “Measurement methodology”. Section “Characterising the cryptomarket ‘AlphaBay’ and comparing markets over time” presents the findings of our long-term study on ‘AlphaBay’ and subsequently compares them over time and with findings of previous studies. Finally, Section “Conclusion” discusses limitations and provides a synthesis of key points, including open questions for further empirical research.

Measurement methodology

This section describes how data from the cryptomarket ‘AlphaBay’ was gathered and analysed. The platform ‘AlphaBay’ offered various psychoactive substances among other goods and services and has been operating as an anonymous marketplace between December 2014 and July 2017, which made it one of the longest running darknet drug markets (Europol, 2017; Gwern, 2017). In July 2017, ‘AlphaBay’ as well as a platform called ‘Hansa Market’ were taken down by a coordinated operation of multinational law enforcement agencies on various continents (Europol, 2017). ‘AlphaBay’, a screenshot of which is given in Fig. 1, was chosen for analysis as it was claimed to be the most popular active market at the time of data collection (Deepdotweb, 2015). In addition, the marketplace offered all transaction mechanisms available,

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