Dark-net websites

An exploratory analysis of the availability of firearms

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Note de recherche no. 23

Université de Montréal

Chaire de recherche du Canada en Sécurité et Technologie

Ce travail a été réalisé dans la cadre du cours CRI-6234, « Nouvelles technologies et crimes » (session d'automne 2014), offert aux étudiants de la Maîtrise en Criminologie sous la direction du Professeur Benoît Dupont.

La Chaire de recherche du Canada en sécurité et technologie de l'Université de Montréal mène des études sur les pratiques délinquantes associées au développement des technologies de l'information, ainsi que sur les mécanismes de contrôle et de régulation permettant d'assurer la sécurité des usagers.

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1. Literature review

This section will serve as an overview of the literature on patterns of gun acquisition and firearm availability.

Braga, Cook, Kennedy and Moore (2002) offer up two facts that seem to set the tone for this subject. The first is that there are four possible ways firearms are illegally supplied to persons who should not have access to them: theft from the authorized pool, use of another person to procure weapons legally (straw purchasers), simply lying about their legal status as well as going through dealers who turn a blind eye to regulations. These can also be referred to as "point sources" where the arms are diverted from dealers or "diffuse sources" such as theft and informal sources (p. 337-338). This is supported by Braga and coll. (2012, p. 791), Pierce, Braga, Hayett and Koper (2004), Cook, Cukier and Krause (2009) and Braga and Kennedy (2001). The second is that most research on gun acquisition centers on incarcerated or arrested offenders. This will be made amply clear as the literature review goes on.

Pierce, et al (2004) used a database from 1999 containing some 83000 recovered crime guns. A full third of these had recently been diverted from legitimate retail sources. Handguns formed 79% of all traced firearms with 46% of these classified as semi-automatics. Of the 70000 guns where point of sale and recovery location were known, 65% of these were found in the same state that they were sold. This fact is echoed by Braga and Kennedy (2001) while Cook, Cukier and Krause (2009) mention that states with weaker regulatory frameworks are more likely to act as originators of recovered handguns.

Caldwell (1995) produced a preliminary report highlighting different findings of their research project on illegal firearm markets. Using data from interviews with 4000 offenders who were recently arrested, the authors indicate that over half the sample (55%) stated that it was easy to obtain a firearm. A quarter of the sample (24%) had used a firearm while committing a previous crime and some 13 percent had stolen a firearm. One-third of the same sample (34%) said they could obtain a gun in a very short time span (less than a week) which compares very favorably with the fact that only 1 of 17 interviewees from Cook, Ludwig, Venkatesh and Braga (2007) said they would be able to obtain a firearm in less than a week. Watkins, Huebner and Decker (2008) concur with this as their respondents (629 adults, 338 juveniles) indicate that a majority of both groups (61% of adults and 63% of juveniles) have little or no trouble obtaining firearms.

Using the same data collection technique Morselli (2002), took a look at the importance of relational aspects involved in obtaining firearms. Among the findings there are two that stand out. The first is the informality of the settings in which these transactions took place. These transactions were of three types: paying in cash, bartering for other services and products and borrowing the firearm from a friend. The second finding is that acquisitions were almost equally done through both weak and strong ties, but very few through the strongest ("personal ties") or weakest ("extended") ties. Most transactions were completed using mid-range ties, what Morselli calls "effective" and "intimate" ties. Morselli continued exploring the importance of networks in obtaining firearms in his 2012 paper. Using 13 incarcerated and 7 non-incarcerated interviewees who purchased 80 firearms during their careers, Morselli once again showed the informality of transactions during which the buyers obtained guns. In fact, 55% of acquisitions came about not as part of active searches on the part of buyers but rather in impromptu offers from contacts. Morselli (2012) also demonstrates that in the case of his 20 interviewees "key point sources" were not nearly as prevalent as past research shows. Most of the buyers operated in open or brokered networks affording them either many contacts that could obtain guns or select intermediaries who also knew where or how to get firearms.

Morselli and Blais (2014) departed from the network theories and used two databases, one national (Canada, 1929 seized guns over a one year period) and the other provincial (Quebec, 44741 guns seized over a ten year period, 501 of these stolen), both dealing with firearms recovered by police. In this study, the main point is not of import to us. What is interesting comes up in the statistics on these databases. For example, in the national database 65% of guns recovered were handguns with 84% of these traced back to the US. As well, one of the most recovered handguns, at 8% of the total, were manufactured by Glock. In the provincial database, 22% of guns recovered were handguns, while 31% of the 501 stolen guns were legally restricted or prohibited with 25% of these handguns.

Finally, Cook, Ludgwig, Venkatesh and Braga (2007) investigate the very high transaction costs faced by prospective buyers of firearms in Chicago and in other cities of the United States. The authors demonstrate the difficulties of obtaining proper information on available stocks and sellers and the problems associated with actually completing a transaction (unenforceable contracts, trust issues, etc). At the same time, buyers and sellers face pressures from police, gangs and certain city or neighborhood traits that ensure that there is a very small market for illegal firearms.

Through this literature review, it seems clear that a scant few have taken an interest in the tangible supply side of the equation, most likely because data has not been accessible or has been lacking. At the same time, nobody has taken an approach solely predicated on the analysis of the available firearms online. The objective of this paper is therefore to evaluate the offering of firearms online on underground websites. The main website to be evaluated is Evolution which also acts as a market for other illegal items and substances. Two more dark websites Middle-Earth and Nucleus were also added to provide a better snapshot of the underground firearm markets online.

2. Methodology

This section will outline the methodology followed in this paper. First, we will expose what data was obtained, from where and how. Next, we will go over the analyses that will be performed in this paper.

i. Data obtained

The data was obtained over a one week period (December 5th-December 12th 2014) from three different deep-Web sites only accessible through the use of TOR. An account was created for each of these sites but no purchases were made and no contact (private message, forum posting or otherwise) was initiated by the author with the vendors. The websites in question are the Evolution Marketplace, the Middle-Earth Marketplace and the Nucleus marketplace. It must be

said that a fourth website was considered, named The Armory, however this one proved to be a no-go as it was a disreputable and known scam website. This site will be discussed further in the paper. Collection of data was done by hand has there was only a small number of vendors and items for sale.
The nicknames of vendors were collected but will not be disseminated for privacy reasons. Next, we collected where the vendors said they were geographically based and where they were able to ship purchased items to. When possible the make, model and calibre of weapon/ammunition were collected as well as the geographic origin of these pieces. Each item was categorized according to the type of item it was: ammunition, shotgun, handgun, rifle, etc. The price in Bitcoins for every item was also collected and converted to US currency using the exchange rate posted at the time (1Bitcoin=356,215 US Dollars). It must be noted that Bitcoin value is extremely volatile and changes very often and thus any data based on it must be taken with a grain of salt. The manufacturer's suggested price or actual retail price of new items were obtained so as to be compared with the prices posted on the marketplaces. We were not able to find this data for all items but we believe we have obtained enough to be able to make our point. Next, we looked at whether the items for sale were used and whether ammunition was sold separately from weapons or packaged with them. The vendor rating was also obtained and an overvalue ratio was constructed using the deep-Web market price of the item divided by the new price of the item as suggested by the manufacturer. This will let us observe if the price quoted by the deep-Web vendors is higher or lower than the suggested retail price and by how much.

ii. Analysis

As this is an exploratory study, the analyses that will be conducted will not be very profound. We are talking about mostly descriptive analysis of the different variables that will be pulled. It may be possible to push into more analytic territory in certain areas, especially with the price data. It should be possible to assess the profit margin or at the very least the added value placed on items by vendors. Another area of interest is the geographic data: do the vendors who say they are based in a certain country only sell arms manufactured in that country or are they generalists who sell whatever they have access to?

If we are relating the findings to existing literature there is one question that has come up as most interesting: does the existence of underground sites such as Evolution permit buyers and sellers to avoid all the transaction costs reported by Cook and colleagues (2007)? In effect, it could be thought that the Internet puts potential vendors in contact with buyers much more easily than before, that information is much more accessible, that trust(while still important) plays much less of a volatile role in transactions and that there are no real outside pressures such as law enforcement to disrupt potential dealings.

3. Results

The following section will present the analytical findings of the study. They will be grouped as such: characteristics of the Websites and the vendors, characteristics of the items sold and price characteristics.

Charateristics of Websites and vendors

There were 90 different item sale pages spread across the three Websites. 73 (81%) of these pages were present on Evolution, 4 (4%) of the pages were on Middle-Earth and 13 pages (14%) were encountered on the Nucleus marketplace website. Interestingly, there is very little cross-usage between platforms: only one nickname (or variation of it) is found on all three websites and the same items are offered for sale by these nicknames.

The items for sale were offered up by 31 different nicknames. The number of items offered by these people varied between 1 and 11 with an average of 2.9 items per vendor. The vendors indicated they were geographically based in 9 different countries or areas: Australia (13 times, 14% of cases), Canada (2 times, 2%), China (3 times, 3%), France (3 times, 3%), Germany (28 times, 31% of cases), Metro France (6 times, 7%), Slovenia (4 times, 4%), USA (12 times, 13% of cases) and Worldwide (19 times, 21%). The last area is probably used to camouflage where the vendor is based. The vendors were willing to send products to five different geographical areas: Australia (13 times, 14%), Europe (32 times, 36% of cases), Metro France (6 times, 7%), USA (9 times, 10% of cases) and Worldwide (30 cases, 33 % of cases). Table 1 tabulates the cross-referencing of areas the vendors ship from and ship to.

Table 1 Cross referencing of areas shipped from and areas shipped to

Ships from	Ships to					
	Australia	Europe	Metro France	USA	Worldwide	Total
Australia	13	0	0	0	0	13
Canada	0	0	0	0	2	2
China	0	0	0	0	3	3
France	0	1	0	0	2	3
Germany	0	24	0	0	4	28
Metro France	0	0	6	0	0	6
Slovenia	0	1	0	0	3	4
USA	0	0	0	9	3	12
Worldwide	0	6	0	0	13	19
Total	13	32	6	9	30	90

We clearly see that most vendors sell in the country or area they say they inhabit. Only a third of (33%) vendors are willing to send purchases worldwide irrespective of where they live, while almost 42% will only send packages to Europe from Europe. Those who sell in the USA only ship to people in the USA (10%) and vendors based in Australia only ship items to other areas of Australia (14%).

Table 2 Cross-referencing of area from which items are shipped from and geographical origin of items

Ships From	Geographical origin of items												
	Unk.	AUS	BEL	CRO	CZR	DEN	FRA	GER	ISR	ITA	RUS	USA	YUG	Tota
Australia	2	0	0	0	0	0	1	0	0	0	0	9	0	13
Canada	0	0	0	0	0	0	0	0	0	0	0	2	0	2
China	3	0	0	0	0	0	0	0	0	0	0	0	0	3
France	0	0	0	0	0	0	0	0	0	0	2	1	0	3
Germany	4	0	0	1	0	0	0	3	0	0	0	19	1	28
M. France	5	0	0	0	0	0	0	0	0	0	0	1	0	6

Slovenia	0	0	0	0	1	1	0	1	0	0	0	0	1	4
USA	1	1	0	0	0	0	0	0	0	0	0	10	0	12
Worldwide	9	1	1	0	0	0	0	1	1	1	1	5	0	19
Total	24	2	1	1	1	1	1	5	1	1	3	47	2	90

Table 2 seeks to represent the links between the geographic areas the vendors say they are based in and the origin of the products they sell. We were not able ascertain the origin of every item however 66 of the 90 (73%) were identified.

Looking at this data, it becomes quite obvious that vendors do not really specialize in firearms or items from their specific region. Of course, European dealers have better access to European manufactured arms and there will therefore be more of those on sale within European circles. But the fact that a majority of items on sale are from the United States illustrates the importance of American arms manufacturing to the world. Most vendors seem to offer at least one American product be it ammunition, accessories or actual firearms. This would seem to support the fact that vendors are not specialists, but rather generalists. They sell whatever they get their hands on.

Characteristics of the items for sale

Table 3 shows the breakdown of all 90 items categorized by type of item. There are 14 different categories and most are self-explanatory. There are a few that warrant an explanation: Gun parts refer to any part (slide, barrel, receivers, magazines, etc) that are needed to make a firearm function properly; Homemade refers to a modification made to a household item so that it fires ammunition (in this case a stapler was modified to fire .22LR caliber bullets); Accessories refers to items such as scopes and laser pointers that can be used to enhance a firearm but are not needed for functionality; finally Heavy Ordnance refers to weapons that are usually military issue (in this case disposable Zolja M80 rocket launchers).

Table 3 Categories of items for sale, frequencies of each, and percentage of total

Type of item	Frequency	Percentage
Gun parts	31	34.4
Ammunition	27	30.0
Handgun	11	12.2
Stungun	5	6.6
3d printed gun	3	3.3
Accessories	3	3.3
Shotgun	2	2.2
Rifle	2	2.2
Assault Rifle	1	1.1
Submachine gun	1	1.1
Homemade	1	1.1
Blank/gas gun	1	1.1
Gun Kits	1	1.1
Heavy Ordnance	1	1.1
Total	90	100

The numbers of the second column show that actual guns make up a total of 20% of items advertised in the weapons sections of the Websites under scrutiny, with 12% of those being handguns. This means that firearms fall to third in importance a good bit behind gun parts at 34% and ammunition at 30%. This however doesn't take into account the amount of each item sold by vendors. The fact remains that some vendors offer more than one of each item they sell and it can be difficult to get an accurate count. When this is taken into account we end up with 29 handguns, 5 assault rifles, 1 submachinegun, 2 shotguns, 2 rifles, 1 blank/gas gun, for a total of 40 firearms for sale with almost three quarters of these handguns. Taken as a whole, this data does indicate that weapons are readily available online but not as available as one would think. It is much easier to obtain ammunition or firearm parts than actual, working firearms.

It is interesting to see that 3D printed guns make an appearance on this list. It shows how new technology has started creeping into the debate since it has been shown that it is possible to create a firearm with 3D printing technology (Wohlers and Caffrey, 2013). However, if one looks at the price of 3D printers, they remain prohibitive to a true mainstreaming. But, it is possible that in a few years more people will have access to one.

It is difficult to say much of anything when looking at the firearm models offered up since they are quite disparate. It is more interesting to look at the make and caliber of items sold on the marketplaces. Table 3 and Table 4 take a respective look at each of these.

Table 3 Make of item available for sale, frequency and percentage

Make	Frequency	Percentage (%)
Unknown	33	36.7
Glock	15	16.7
Magtech	6	6.7
Winchester	5	5.6
Advanced Armament Co.	2	2.2
Arma Grupa	1	1.1
Brownells	1	1.1
Browning	2	2.2
Bushmaster	1	1.1
Colt	1	1.1
Dansk Rekyl Riffel S.	1	1.1
Defense Distributed	1	1.1
Gevarm	1	1.1
Heckler & Koch	1	1.1
Kalashnikov	2	2.2
Keltec	1	1.1
Mauser	1	1.1
Military Technical Ins.	1	1.1
Mossberg	1	1.1
RIO	1	1.1
Rottweil	2	2.2
Ruger	1	1.1
Simmons Optics	1	1.1
Sturm & Ruger	1	1.1

Tapco	2	2.2
Tokarev	2	2.2
Umarex	1	1.1
Zastava Arms	1	1.1
Zenit Belomo	1	1.1
Total	90	100.0

We were not able to ascertain the make of over a third (36.7%) of all items. Either it was not listed or it wasn't possible to cross-reference the product online. Most of the other makes only appear once or twice. Interestingly, it is in handguns and ammunition that we see an increase in the same makes. Winchester (5.6%) and Magtech (6.7%) are the two ammunition companies who make an impact while Glock (at almost 17%) of items comes up most often in handguns and firearms in general. Glock is a well-known manufacturer of firearms with a long tradition of quality, reliability and affordability. It is not a surprise to see the company feature so prominently on these sites.

Table 4 Caliber of items sold, frequency and percentage of total		
Calibre	Frequency	Percent of total (%)
Unknown	23	25.6
.22 LR	9	10.0
.22 Mag	1	1.1
.223 or 5.56	2	2.2
.32 ACP	2	2.2
.357 Mag	2	2.2
.38 Special	1	1.1
.380 Auto	1	1.1
.40	2	2.2
.44 Mag	1	1.1
.45 ACP	3	3.3
.45 G.A.P	1	1.1
10mm	1	1.1
12 gauge	6	6.7
3.5mm	1	1.1
5.45X39mm	1	1.1
5.56X45mm	2	2.2
64mm	1	1.1
7.4mm	1	1.1
7.62mm39mm	1	1.1
7.62mm	2	2.2
7.92X57mm Mauser	1	1.1
9mm	20	22.2
Any	1	1.1
By Order	4	4.4
Total	90	100

When talking about caliber it is important to know that one bullet can be known under different designations. As such a .45 Automatic Colt Pistol bullet can also be known as a .45 ACP or a .45 Auto. However, the .45 ACP bullet is different from a .45 Colt bullet. It is thus easy to lose ourselves in specifics. In the table above, we did our best to group the calibers that were the same together. Just over a quarter (25.6%) of products had no caliber (not identifiable or does not use ammunition). Unsurprisingly, the 9mm cartridge was favored amongst all calibers with just under a quarter of all items using it (22.2%). This is followed by the .22 Long Rifle with 10% of items using it and 12-gauge ammunition with under 7% (6.7%). The rest of the field mostly come in under 3%. There are two last interesting categories and these are the one labeled “By Order” and “Any”. This means that there are vendors who say they can cater to their clients’ needs, obtaining any kind of caliber firearm they are asked to obtain. This would point to the fact that some vendors have a direct pipeline to a fresh supply of firearms, while others sell items that come their way.

When linked with the facts that most firearms sold on these underground websites are handguns and that the make/manufacturer most seen is Glock, it becomes obvious why the 9mm cartridge would be the one most offered for sale. The 9mm is, like Glock, a known quantity. It is an affordable bullet, widely available, widely used and has a good reputation with military outfits and civilians alike.

Table 5 intends to examine the relationship between the products offered for sale and whether they are used or not. 22 cases (24.4%) do not have this information as it was unavailable from the dealers. This leaves us with just over three quarters of our sample or 68 cases.

Table 5 Products cross-referenced by use status

Product	Used		Total
	No	Yes	
Handgun	1 1.5%	9 13.2%	10 14.7%
Shotgun	0 0.0%	2 2.9%	2 2.9%
Ammunition	26.0 38.2%	0 0.0%	26 38.2%
Stun gun	0 0.0%	1 1.5%	1 1.5%
Gun parts	10 14.7%	8 11.8%	18 26.7%
3d printed guns	2 2.9%	0 0.0%	0 2.9%
Assault Rifle	0 0.0%	1 1.5%	1 1.5%
Submachine gun	0 0.0%	1 1.5%	1 1.5%
Rifle	0 0.0%	2 2.9%	2 2.9%
Accessories	1	1	2

	1.5%	1.5%	2.9%
Blank/gas gun	0 0.0%	1 1.5%	1 1.5%
Gun kits	1 1.5%	0 0.0%	1 1.5%
Heavy	0 0.0%	1 1.5%	1 1.5%
Total	41 60.3%	27 39.7%	68 100.0%

Looking at these figures, the first thing that pops up is the fact that well over half (63%) of all items claimed to be unused are ammunition which goes without saying since used ammunition is spent ammunition. This would render it useless and selling it would not be feasible. This only leaves a select amount of items that are actually unused and for sale. Interestingly, only 1 firearm for sale is categorized as new while the rest are categorized used meaning they had at least one previous owner and were fired at least once before reaching the dealer. The gun parts category is the final interesting thing to discuss. It is split somewhat evenly between used and unused. meaning some vendors are able to obtain new parts from manufacturers (Tapco, etc) while others chop up guns they obtained second hand. Braga and Kennedy (2001, p.386) touch on this fact, writing that “it is, in reality, advantageous for firearm traffickers to divert second-hand firearms from retail sources. A trafficker can acquire guns at a discounted price; a second-hand Glock 9 mm pistol costs less than a new Glock 9 mm pistol and will likely get the same price on the street.”

The final table of this section, Table 6, seeks to correlate products for sale with whether or not their sale includes ammunition shipped with the product. The data for this is available in 92.2% of cases or 83 out of 90 items.

Table 6 Products correlated with whether they include ammunition

Product	Ammo Included		Total
	No	Yes	
Handgun	4 4.8%	5 6.0%	9 10.8%
Shotgun	1 1.2%	1 1.2%	2 2.4%
Ammo	0 0.0%	27 32.5%	27 32.5%
Stun gun	1 1.2%	1 1. 2%	2 2.4%
Gun parts	31 37.4%	0 0.0%	31 37.4%
3d printed gun	2 2.4%	0 0.0%	2 2.4%
Assault Rifle	1 1.2%	0 0.0%	1 1.2%
Submachine gun	0 0.0%	1 1.2%	1 1.2%

Rifle	2 2.4%	0 0.0%	2 2.4%
Homemade	0 0.0%	1 1.2%	1 1.2%
Accessories	2 2.4%	0 0.0%	2 2.4%
Blank/gas gun	1 1.2%	0 0.0%	1 1.2%
Gun kits	1 1.2%	0 0.0%	1 1.2%
Heavy	1 1.2%	0 0.0%	1 1.2%
Total	47 56.6%	36 43.4%	83 100.0%

As we can see, most items do not come with ammunition. Either they do not use it or the vendor does not supply it. It comes as no surprise that the majority of the cases in the yes column are cases where ammunition is sold and therefore it is logical they would include ammunition. Accounting for this, the actual number of cases with ammunition included in the purchase falls to 9 or just under 11% of cases. Quite interestingly, the majority of this number is made up by handguns (5 cases). Add to this the other cases of firearms shipped with ammunition (1 shotgun and 1 submachine gun) and the picture that forms can be a little alarming: once they receive their purchase, clients are in possession of a fully functioning weapon, untraceable and unregistered.

Price characteristics

Table 7 presents the collated price data of items sold on the three underground websites studied. It depicts the price asked in Bitcoin, its conversion in US dollars as well as the average, standard deviation, minimum and maximum for each category of product offered for sale. The price data is available for 89 of the 90 items for sale. The only case missing is from a vendor selling ammunition by order only. We expect that he quotes a price once his clientele tells him what caliber ammunition and the amount they want. One last remark must be made for this data: the cost data for ammunition is per bullet/shell.

Table 7 Price data in BTC and US$

Product	N	Mean	Std Dev	Minimum	Maximum
Handgun	11	3.26 1160.16	1.43 509.95	.92 326.12	5.55 1976.82
Shotgun	2	3.29 1172.57	.76 268.99	2.76 982.37	3.83 1362.77
Ammo	26	.02 7.78	.05 18.73	0.00 0.25	0.20 71.17
Stun gun	5	.76 269.12	1.17 416.89	.14 50.69	2.84 1012.97
Gun parts	31	.59 211.52	.60 213.25	.02 6.20	2.52 899.44
3d printed	3	0.00	0.00	0.00	0.01

		1.75	1.74	0.50	3.74
Assault Rifle	1	3.30 1175.51	- -	3.30 1175.51	3.30 1175.51
Submachine	1	9.33 3322.85	- -	9.33 3322.85	9.33 3322.85
Rifle	2	3.53 1257.12	1.74 620.09	2.30 818.65	4.76 1695.59
Homemade	1	0.12 42.07	- -	0.12 42.07	0.12 42.07
Accessories	3	0.60 212.15	0.84 297.99	0.09 30.39	1.56 556.05
Blank/gas gun	1	2.13 758.70	- -	2.13 758.70	2.13 758.70
Gun kits	1	4.26 1516.80	- -	4.26 1516.80	4.26 1516.80
Heavy	1	0.21 74.73	- -	0.21 74.73	0.21 74.73
Total	89	1.05 373.69	1.66 591.45	0.00 0.25	9.33 3322.85

Most of the item categories show a wide margin between the minimum and maximum quotes which is typical of a marketplace such as Kijiji, eBay and the underground markets patterned after them. Vendors post items and ask whatever price they wish. Clients either pay the price or look for a better deal all the while opening themselves to rip-off artists. The next table, Table 8, looks into the over-evaluation of products by vendors. This data is truly the crux of this paper and was obtained by comparing the manufacturer suggested retail price or a similar proxy with the price asked by vendors. Data for this section was only found for 22 of the 90 items and should thus be taken with a grain of salt. Nonetheless, it does paint a stunning picture of the underground markets under study.

Table 8 Item, US$ price, US$ price new and over-evaluation			
Item	US$ price	US$ price new	Over-evaluation
Heckler & Koch magazine	6.20	19.95	.31
Simmons Optics scope	50.01	99.95	.50
Advanced Armament AR-15 Barrel	275.18	425.00	.65
Advanced Armament AR-15 Barrel	295.98	425.00	.70
Glock 17	528.98	599.00	.88
Ruger 44 Magnum	925.23	739.00	1.25
Mossberg 702 magazine	50.87	29.99	1.70
Zenit Belomo Rifle Scope	556.05	265.00	2.10
Glock .40 magazine	74.95	35.42	2.12
Glock 9mm magazine	75.02	35.42	2.12
Glock 19	1624.59	649.00	2.50
Winchester 12 gauge ammunition	8.61	2.92	2.95
Brownells Glock 17 barrel	390.95	129.95	3.01
Winchester 12 gauge ammunition	8.89	2.92	3.04
Glock 23	1976.82	599.99	3.29

Umarex P99	758.70	218.82	3.47
Glock 22 frame	899.44	225.00	4.00
Keltec PF9	1581.45	340.00	4.65
Magtech 9mm ammunition	2.10	00.38	5.52
Magtech 9mm ammunition	2.17	00.38	5.70
Tapco SKS Stock	501.66	79.99	6.27
Tapco SKS magazine	200.66	19.99	10.04
Mean	490.66	224.68	3.03

In this table, a value of 1 in the over-evaluation column denotes equality between the price asked by the vendor and the suggested retail price. Any value below 1 would indicate a bargain and any value above 1 means the vendor is over-pricing his wares compared to the actual retail price of the item.

Out of 22 items, 5 of them (22.7%) would be considered a bargain compared to the price that would be paid for a new item. Of these 5 items, 4 are accessories or gun parts, while the last item is a working firearm. Interestingly, the asking price for that firearm is very close to the new price one would pay if buying directly from Glock. The other 17 items could all be considered as over-valued compared to the prices one would pay for the new product. Most of these items (13) are ammunition, accessories and gun parts while the 4 remaining are firearms. These 4 are heavily over-valued with an asking price between 1.25 and 4.65 times what the suggested retail price is.

4. Discussion

This next section looks to pull together the disparate findings from the sub-sections above: in essence, what can be said about obtaining firearms on underground market websites such as Evolution, Middle-Earth and Nucleus?

There were 90 firearm-related items on sale, spread across the three websites with a strong majority of them on Evolution. This does seem to point to the primacy of Evolution in the dark-net markets as it clearly is the place to be to sell a multitude of products. Within these three websites, there are 31 different vendors using 31 different nicknames. There is also very little cross-platforming as only one nickname comes up on all three website.

These 31 vendors are based in 9 different countries or geographic locations and most them will only ship products to the areas they inhabit. Only 33% will ship to anywhere in the world. When it comes to the origin of the products they sell, it appears that most vendors are generalists, not really specializing in items from their home areas. European dealers do deal in more European products and American dealers deal in more American products but there is still a substantial amount of cross-vending.

The 90 items sold can be categorized in 14 different categories with gun parts (34%), ammunition (30%), handguns (12%) and stun guns (7%) forming the main products sold. Of the products that have an identifiable manufacturer, 17% are from Glock, 7% from Magtech and 6% from Winchester. The most prominent caliber of items sold is the 9mm with 22% of items using that type of ammunition. This is followed by the .22LR caliber (10%) and 12 gauge shells (7%). A majority of items (60%) are sold unused but this is inflated by ammunition which is new by definition. When looking at firearms, 17 of the 18 on sale are sold used. 6 of these 18 guns are also shipped with ammunition.

When it comes to prices, of the 22 items for which data was available, over three-quarters (77%) of cases are overvalued, some as much as 10 times the new price of the item. Of these 22 items, 5 of them are firearms with 4 highly over-valued (between 1.25 and 4.65 times the new price).
It would seem that the online dark-net markets are not the Mecca they would appear to be for buyers looking to buy firearms illegally. The fact is that in terms of firearms, they are few and far between and when they are available they are heavily overvalued, costing sometimes as much as 5 times the retail price of a new firearm. These two facts taken together return us to the notion of “market thinness” brought about by Cook, Ludwig, Venkatesh and Braga (2007).

Yes, it is easier to obtain information on the products that are for sale on these underground markets. Most vendors have pictures and descriptions of the products as well as being available for communication by private messages should the prospective buyer have questions or concerns. Yes, it is technically easier to find sellers and buyers online as the Internet creates a “convergence setting” for them while giving them a certain amount of protection from police scrutiny. But if the market offering is small to begin with and the prices for the items in this market are extravagant then information asymmetry and protection from outside pressures (gangs, police, etc) become moot points.

There is an argument to be made for the high prices seen on deep-Web marketplace. One could liken this to the price of drugs as represented by Reuter and MacCoun (2001) republished by Kopp (2006). In this analysis, almost 60% of the price paid for drugs is to compensate risks of violence and risks of incarceration. Inflating the prices for guns may be a mechanism of the same nature.

Even with all the access to information on these deep-Web markets, one must still contend with rippers and scammers. A cursory look at the Evolution discussion boards revealed that at least three of our vendors had been accused of being scammers either about a product they had sold in the past, one of the products they were selling presently or for impersonating another vendor. Couple this with the fact that a few of our vendors do not use escrow when selling weapons but rather use FE (finalized early) in which the money paid by the client is deposited directly to the vendor *before* he sends the product to the client and it becomes obvious that rip-offs, scams and frauds are alive and well in markets such as Evolution, Middle-Earth or Nucleus.

5. Limits and future research

The first limitation of this study comes from the essence of the Internet itself: it is such a quick-paced environment, a system that develops faster than most users can adapt. This means that a whole lot of information becomes obsolete very quickly. As such, it becomes hard to generalize the findings of this study to other markets or even to the same markets a month down the road.

What this paper provides is a very quick snapshot of the state of the underground markets at a very precise point in time.

The second limitation is situated in the methodology. This study is quite exploratory and this means that there isn't any in-depth look at the data. All we are trying to do is present the phenomena without pushing the analysis too far. Criticism can thus be focused at this level.
As for avenues for future research, there are a few things that came up during the course of this paper that warrant more attention. The first avenue of possible research is the use of FE (Finalized Early) by the vendors, in other words paying in full before the items are sent. A certain amount of vendors selling firearms use this and it would be interesting to have more information on this practice. Of course, finalizing a sale early means that the clientele opens themselves up to being ripped-off by the vendors and if a majority of gun dealers use FE, it would be of value to understand why (looking to rip-off customers, looking to avoid police crackdowns, etc).

A second avenue of interest lies in the fact that some vendors we looked at dabbled in more than selling firearms and firearm related items. Some sold counterfeit items, fraud related services, credit card numbers and drugs. To understand what pushes vendors to diversify as well as investigating whether there are any vendors who specialize in firearms could greatly enhance our understanding of underground markets.

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