Economic Review and Street crime Analysis Using Cell Phone Snatching and Theft

Qamar Ul Arifeen[*, 1], S M Aqil Burney[1], Nadeem Mahmood[1], Kashif Rizwan[1, 2], Syed Abdul Khaliq Bari[1]

[1]Department of Computer Science, University of Karachi, Main University Road, PAKISTAN
[2]Department of Computer Science, Federal Urdu University of Arts, Science & Technology MSc Block, Block 9, Gulshan-e-Iqbal, PAKISTAN

ABSTRACT

This paper analyses the economic logic behind street crimes (specifically, the cell phone snatching) by comparing the marginal cost, revenue and profit from cell phone snatcher and the other related people. The analysis is carried out by using the qualitative information for arrested cell phone snatchers as well as some of the officers from law enforcement agencies. The obtained information is then combined with the data source of 19 towns of Karachi for 2010. The paper than estimates the town wise annual revenue generated from cell phone snatching. The analysis also covers some of the other related dimensions of cell phone snatching. The study indicates that the cell phone snatching may increase in the future because of the lack of legally imposed cost on the cell phone snatchers and more importantly, on the middle man and the shopkeeper in the market who complete the cycle.
KEY-WORDS: - Cellphone snatching, cellphone theft, economy, business, street crime, revenue, cellphone market, cell phone industry, Supply chain management, partnership development

1 INTRODUCTION

Pakistan has become the large cell phone users. The Human capital is very high as well [1] and the job market is not filthy rich as compared to top ranked developing countries. Pakistan became charming industry for cell phone manufacturers and distributors as well [2]. Crime can be taken as an economic bad. Such an act, that is worth allocating scarce resources to avoid its presence. It this way, it is very important to know the economic and social cost of crime so that the resource allocation is made accordingly [3]. Criminal activities are not alike in terms of their economic, social and psychological impact on the victims and on the other observers [4]. This is the reason why some of the criminal activities should be taken more seriously than the others in terms of resource allocation. [5]

Especially in case of under developed countries, where the financial and structural resources usually are far lower than necessary the need of categorizing the criminal activities become essential. In the process of categorizing the criminal activities, the economic and social cost of the activity should be compared with the explicit cost of reducing the criminal activity. If the explicit cost is higher than the economic and social cost of that crime, the resources for crime reduction should be transferred to the criminal activity where the economic and social cost of crime is higher.

Different criminal activities like extortion, kidnapping for ransom and street crimes are the ones that are highly undesirable because they led to the reduction of business activities and also become a barrier for the internal and external investment [6] [7].

The present study analyses the phenomenon of cell phone snatching and theft in the 19 towns of Karachi. In the first, the qualitative information is collected by interviewing the officers of law enforcement agencies as well as with the arrested cell phone snatchers. The obtained information is than combined with the cross sectional daily data for the 19 towns of Karachi in 2010. The obtained information is then used to analyze the marginal cost, marginal revenue and the marginal profit associated with the cell phone snatching/theft in Karachi [8].

The section 2 describes the equations used in the marginal analysis and compared the theoretically expected results from the real data[1]. Section 3 discusses the findings in the section 2, and relates the information of marginal analysis in analyzing the town wise revenue of the different stake holders of the whole process, Section 4 concludes and section 5 discussion and future recommendations.

2 Materials and methods used for analysis of cell phone snatching/theft sector in Karachi

There are many questions which help to understand the whole process. For example; how do the cell phone snatching/theft sector work? How the income is generated and how does it distributed? These, and even more questions

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[1] Data Source: Citizen Police Liaison Committee, Karachi, Pakistan

Corresponding Author: Qamar ul Arifeen, Department of Computer Science, University of Karachi, Main University Road, Postal code: 75270 PAKISTANarifeen@uok.edu.pk

were asked to the law enforcement agencies as well as to the arrested cell phone snatchers and the obtained information and analysis is presented below [9] [10] [11].

2.1 Cycle of cell phone snatching

The whole process is generally comprised of three stages as shown in Fig. 1, (There are other different possibilities also exist; for example the cases, where cell phone snatcher does the job of selling the cell phone himself). In the first stage, the snatcher executes the job of cell phone snatching. The snatched cell phones are than sold to the middle man who is the intermediate between the snatcher and the shopkeeper. The shop keeper is the one, who completes the cycle of re-selling the cell phone to the general consumers. The cycle of this process is presented below.
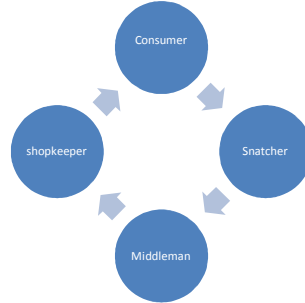
Fig. 1: Cell phone snatching and revenue generation cycle

As the flow chart shows, the process starts from as well as ends to the consumers, the cell phone users. An average snatcher snatches around 20 cell phones per day according to the interviewees. Though this information is very important for estimating the field force of snatchers in the 19 towns however, the obtained information poses a set of questions. If an average snatcher/thief takes around 20 cell phones per day (assume that he works 5 days in a week), he snatches/theft around 400 cell phones in a month and 4822 (approx.) cell phones per year. In this case, there are only 14 snatchers (Number of snatched/theft cell phones in 2010 were 63477. So, 63477/4822 = 13.224) who cover the 19 towns in Karachi which is certainly not the case. If an average snatcher/thief snatches/theft around 10 cell phones per day even than 28 snatchers/thief would be sufficient for executing the job of snatching 63477 cell phones per year.

This finding can be justified in two ways. 1st, there are really very few cell phone snatchers/thief who perform this job in all the 19 towns in Karachi and they have been working in a similar pattern as the commercial organizations works. In this case, the entrepreneur of this activity is the one who regulates the whole process and remove the hurdles in the process. 2nd, the reported incidents are far lower than the actual incidents which implies the actual revenue of this activity can be many folds higher than the estimated revenue (Even though people usually get these incidents recorded in CPLC to prevent the misuse of their cell phones in any criminal activity).

2.2 Marginal analysis

The quantitative data as well as the information obtained from the interviewees enable us to analyse three stages of the whole process. The analysis is done by using the secondary data from Economic survey of Pakistan 2009-10 as well as the information obtained from the interviewees.

The findings are very surprising. The cell phone snatcher who takes the maximum risk in the whole process is the one who is left with the least return in the process while the middle man and the final re-seller of the stolen/theft/snatched cell phone are the people who takes the maximum benefit while enjoy minimum share in the risk.

2.3 Marginal cost and revenue and profit of the cell phone snatcher

The marginal cost of cell phone snatching is the sum of expected opportunity cost of being arrested (MC_A), expected opportunity cost of death during snatching (MC_D) and expected opportunity cost of being injured (MC_I).

$$MC = MC_A + MC_D + MC_I \qquad (1)$$

Where, marginal cost of being arrested is the product of the probability of being arrested * opportunity cost of being arrested.

$$MC_A = P(A).(A) \qquad (2)$$

And the marginal cost of death is the product of the probability of death associated with cell phone snatching * opportunity cost of death.

$$MC_D = P(D).(D) \qquad (3)$$

And the marginal cost of injury is the product of the probability of injury associated with cell phone snatching * opportunity cost of injury.

$$MC_I = P(I).(I) \qquad (4)$$

Opportunity cost of being arrested, death and injury depends on different factors that can be proxied through time.

$$A = f(t) \qquad (5)$$

D = f(t)   (6)

I = f(t)   (7)

Opportunity cost of being arrested, death and injury increase with time due to increase in the minimum wages (Assuming the probabilities of being arrested, injury and death are constant).

$\partial MC_A / \partial t = \partial P(A) . \frac{A}{\partial A} * \frac{\partial A}{\partial t}$ (8)

And,

$\partial MC_D / \partial t = \partial P(D) . \frac{D}{\partial D} * \frac{\partial D}{\partial t}$ (9)

And,

$\partial MC_I / \partial t = \partial P(I) . \frac{I}{\partial I} * \frac{\partial I}{\partial t}$ (10)

The marginal cost of cell phone snatching is therefore expected to increase with time.

$\partial MC / \partial t = \partial MC_A / \partial t + \partial MC_D / \partial t + \partial MC_I / \partial t$ (11)

As,

$\frac{\partial A}{\partial t} \geq 0, \ \frac{\partial D}{\partial t} \geq 0 \text{ and } \frac{\partial I}{\partial t} \geq 0$ (12)

Therefore,

$\partial MC / \partial t \geq 0$ (13)

Total revenue, at the other hand, is the product of price per cell phone and the quantity of cell phones.

TR = Pq   (14)

$MR = \frac{dTR}{\partial q} = P$ (15)

Π = TR – TC   (16)

TR – TC = Profit = Ψ   (17)

Profit would start declining when marginal cost increases more sharply than the marginal revenue. This would happen when the price of snatched cell phones are relatively sticky or increase in a relatively lesser proportion than the opportunity cost as time passes through.

$\frac{d\Psi}{dt} \leq 0$ when $\frac{dMR}{dt} \leq \frac{dMC}{dt}$ (18)

Profit would be negative when marginal cost is higher than increases more sharply than the marginal revenue.

$d\Psi \leq 0$ when   MR ≤ MC   (19)

and similarly,

$d\Psi = 0$ when   MR = MC   (20)

Or,

P = MC   (21)

Or,

$P = MC_A + MC_D + MC_I$ (22)

     Theoretically, the cell phone snatching would become an economically infeasible activity after the time t when $d\Psi/dt$ = 0 however this might not be the case if the snatcher is not able to evaluate the opportunity cost and has myopic behavior. In that case, the money illusion may still instigate the person to keep continuing the activity even though $dTC/dt \geq dTR/dt$.

     The calculation of expected cost and revenue associated with involving in an individual event of cell phone snatching is given in Tables 1(a) and 1(b) (The explicit cost of the snatcher, like the cost of petrol consumed in the process of cell phone snatching etc. is assumed to be zero in order to make the analysis simple. The interviewees informed that the explicit cost is almost negligible however). The information about snatcher's average age, average cost of settlement without following the legal procedure, average time required to recover from a serious injury etc. are taken from the interviewees while the probabilities of various events belong to the recorded incidents of the year 2010 (For example; in 2010, 4 cell phone snatchers are died while 63477 cell phones were snatched, so P(d) = 4/63477 = 0.000063).

Table 1(a): Detailed study of revenue involved

Average age of the snatcher = 25 years
Minimum salary in the job market Rs. 7000.
Probability of getting a job (Calculated through age specific unemployment rate) = 0.957
Probability of death associated with snatching the cell phone = P(d) = 0.000063
Probability of being Arrested = P(a) = 0.001
Probability of settlement without following the legal procedure = P(is) = 0.9
Average cost of settlement without following the legal procedure = 2000
Probability of legal punishment   = P(lp) = 0.1
Cost of legal punishment = 6 * 7000 = 42000 (6 month jail x average

monthly income)
Probability of serious injury = P(si) = 0.001
Monetary cost of serious injury = 6 * 7000 = 42000 (6 month treatment and rest * average monthly income)
Expected cost of being arrest = P(a) * Monetary burden of being arrest
Expected value of the monetary burden of being arrest = P(is) * Amount paid for illegal settlement
+ P(lp) * Cost of legal punishment
Expected value of the monetary burden of being arrest = (0.9 * 2000) + (0.1 * 42000) = 2220
Expected cost of being arrested = 0.001 * 2220 = 2.22
Expected cost of injury = P(inj). Monetary cost = 0.001 * (42000) = 42
Expected cost of death during cell phone snatching = P (d)* [(60 – 25) * (12) * 7000]
= 0.000063 * 2940000 = 185.22
Expected marginal cost of cell phone snatching = E(a) + E(inj) + E(d)
Expected marginal cost of cell phone snatching = 2.22 + 42 + 185.22 = 229.44
Marginal revenue = Unit price = 300

This data shows that the marginal revenue higher than the marginal opportunity cost of the cell phone snatching that might be the reason why this particular street crime has been on its expansion for the last several years. The marginal cost, revenue and profit curves for the cell phone snatcher is presented in the Fig. 2.
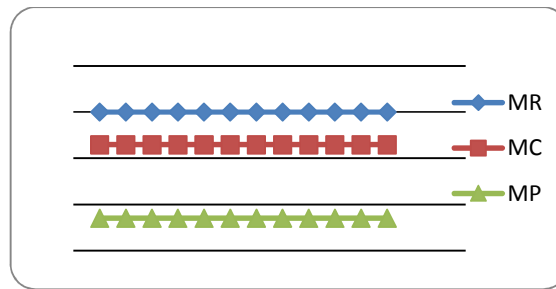
Fig. 2: Marginal cost, revenue and profit of snatcher

It is shown in the graph that the marginal profit is positive for the cell phone snatcher so he is expected to continue his activity. Because of the profitability in this activity, the situation may attract (perhaps, has been attracting) the new criminals to start their journey from this small scale and least cost crime.

Table 1(b): Risk and profit Margin

Probability of death associated with selling snatched cell phone = P(d)
Probability of being Arrested = P(a)
Probability of settlement via bribe = P(svb)
Probability of legal punishment = P(lp)
Cost of legal punishment = 6 * 7000 = 42000   (Six month imprisonment * average monthly income)
Probability of serious injury = P(si)
Expected cost of being arrest = P(a) * Monetary burden of being arrest
Expected cost of injury = P(inj). Monetary cost
Expected cost of death during cell phone snatching = P (d)* Expected future income
Cost incurred in purchasing the cell phone = Price
Marginal opportunity cost of cell phone snatching = E(a) + E(inj) + E(d) + Price
Marginal profit for middle man   =   Marginal revenue – Marginal cost = 500
Marginal profit for shopkeeper   =   Marginal revenue – Marginal cost = 800

The marginal opportunity cost for snatcher is likely to increase every year because of an increase in the minimum wages and the probability of being arrested while the marginal revenue is known to be relatively inelastic (As the interviewees told that the Rs.300 per cell phone is the lump sum unit price for several years) so the marginal profit is expected to decline in the future.

One might think that It is surprising that the expected cost of injury and death (both of these are imposed by the general public, not by the legal system) is far higher than the expected cost of being arrested which implies that there are greater incentives for an snatcher to be arrested by the law enforcement agencies than to be caught by the general public.

2.4 Marginal cost and revenue and profit of the middle man and the shopkeeper

The marginal revenue and marginal opportunity cost estimation is presented below by following the same procedure as adopted in the previous section. The estimation is done by using the information from interviewees.

In case of selling the snatched cell phone, the probability of being arrested, being injured and being death is zero (As no such incident is recorded in 2010 where the middle man or a shopkeeper is arrested, injured or died in the process of re-selling the cell phone phones) that's why the expected values associated with these situations would also be zero and the marginal opportunity cost for the shopkeeper would be equal to the purchase price (In case of the middle man, the cost side information (The risks associated with the job and the explicit cost) is not available, so it could not be analysed. Even though, the chances are greater than the middle man could be the one who enjoys the net maximum benefit of the whole process).

The data suggests that there are greater incentives for the middle man and shopkeepers than the cell phone snatcher to collude with the people who are responsible for reducing the cell phone snatching process. In case of collusion between the snatcher and the officials, the opportunity cost of cell phone snatching is likely to increase (Though this will decrease the probability of being arrested).

3   RESULTS

There are 63,477 cell phones that are reported as snatched / theft or missing from January to November 2011 in Karachi out of which, 26,178 are reported as snatched or theft (The analysis is based on snatched and theft cell phones therefore the data of missing cell phones is not included in the analysis). The Fig. 3 presents the month wise breakup of the snatched and theft cell phones.
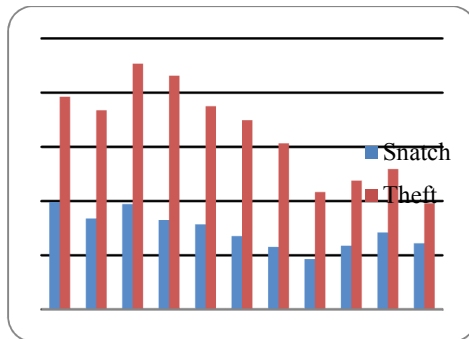
Fig. 3: Mobile Phone Snatching &Theft in 2010

The data shows that cyclical movement in these activities however, an overall downward trend can be observed in the data. Though the magnitudes of cell phone snatching and theft are very different however the variation in both the series seems to be connected. The month wise trend in these activities has strong and positive correlation (The coefficient of correlation is 0.847 between the two series) which implies that the executers of these activities may have strong association.

The Fig. 4 presents the town wise breakup of the snatched and theft cell phones in order to see the town wise distribution of these activities.
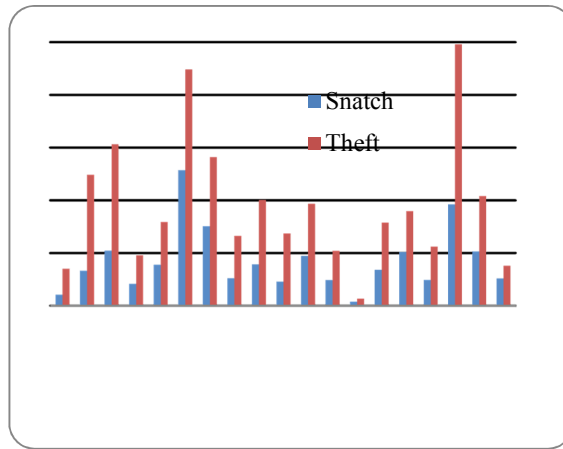
**Fig 4: Town wise break up of mobile snatching/ theft in 2010**

As shown in the graph that the highest number of cell phones that are recorded as theft are recorded to be done in the Saddar town while the Gulshan-e-Iqbal is on second number in this respect while the least number of incidents are recorded from Malir town. Gulshan-e-Iqbal town is the town with highest number of cell phone phones that are recorded as snatched while Saddar town is on second number in this regard. The data on cell phone phone snatched and theft if sound to have a very high positive correlation (Value of correlation is 0.926) implies the chances of a relationship between these two activities.

In order to make the data easily comparable, the town wise cell phone snatching and theft index is presented in the Fig. 5. In case of cell phone snatching, Data of Gulshan-e-Iqbal town (1,286) is used as bench mark where while in case of cell phone phone theft; data for Saddar town (2480) is used as a bench mark.
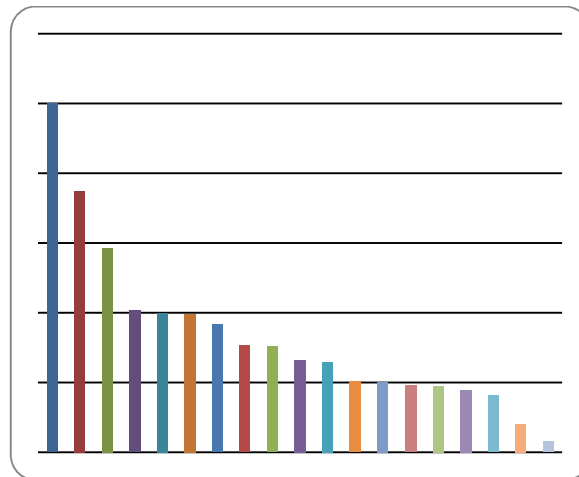
Fig. 5: Snatching index

As the index shows, the town with the most of the recorded cell phone snatching cases is Gulshan-e-Iqbal town while Malir town is the town with the minimum of such recorded cases. Saddar town in the second and Jamshed abad town is the third town with respect to such activities. Clifton, Shahrah-e Faisal and North Nazimabad towns are facing almost same level of cell phone snatching.
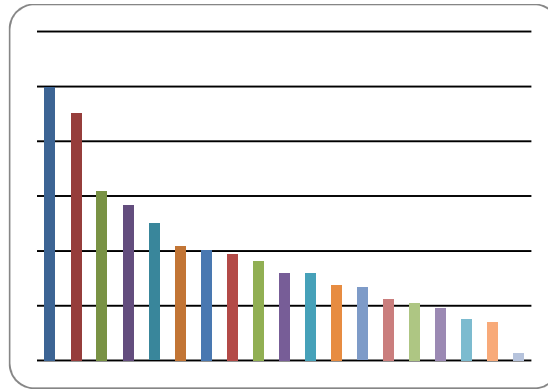
Fig. 6: Theft index

The town wise relative magnitude of cell phone phone theft is presented in the Fig. 6. In case of cell phone phone theft, Saddar town is the one with most of such incidents while Gulshan-e-Iqbal town is the second while Clifton town is the third town in this regard.

3.1 Town wise annual revenue of the snatched/ theft cell phone
With the help of the information about the share of snatcher, middle man and the shopkeeper on each snatched/ theft cell phone, the table 2 represents the town wise revenue of the snatcher, middle man and the shopkeeper from these cell phones.

Table 2 shows that the snatchers earn 7.8 million rupees per year while the middle man and the shopkeepers earn around 13.08 million rupees each by these cell phones (These values will increase many folds if the data for missing cell phones is also included in the analysis). As, the analysis used the official data for snatched/theft cell phones which is likely to be under estimate the revenue, 34.03 million rupee is the minimum revenue obtained from the snatched/theft cell phones in Karachi. The main contributor in this revenue is the Gulshan-e-Iqbal town. The snatchers, middle man and the shopkeepers earn around 1.05 million, 1.76 million and 1.76 million (a total of 4.5 million rupees) from the snatched/theft cell phones of Gulshan-e-Iqbal town.

4. DISCUSSION AND CONCLUSION

Cell phone snatching is one of the least cost crimes in Pakistan where the major share in the cost is imposed by the general public, not by the legislation. This implies that the legal cost of cell phone snatching is currently far lower than the sufficient level.

Table 2: annual revenue of the snatched/ theft cell phone w.r.t town

Name of Towns	Annual total revenue in 2010 (In million rupees)			
	Snatcher	**Middle man**	**Shop keeper**	**Total**
Baldia	0.1368	0.228	0.3648	0.7296
Bin Qasim	0.4725	0.7875	1.26	2.52
Clifton	0.6165	1.0275	1.644	3.288
Gadap	0.2058	0.343	0.5488	1.0976
Gulberg	0.3555	0.5925	0.948	1.896
Gulshan-e-iqbal	1.0581	1.7635	2.8216	5.6432
Jamshed abad	0.6492	1.082	1.7312	3.4624
Kemari	0.2772	0.462	0.7392	1.4784
Korangi	0.4188	0.698	1.1168	2.2336
Landhi	0.2748	0.458	0.7328	1.4656
Liaquatabad	0.432	0.72	1.152	2.304
Liari	0.2298	0.383	0.6128	1.2256
Malir	0.0321	0.0535	0.0856	0.1712
New Karachi	0.339	0.565	0.904	1.808
N.Nazimabad	0.4224	0.704	1.1264	2.2528
Orangi	0.2418	0.403	0.6448	1.2896
Saddar	1.0326	1.721	2.7536	5.5072
Shah Faisal	0.4668	0.778	1.2448	2.4896
SITE	0.1917	0.3195	0.5112	1.0224
Total	7.8534	13.089	20.9424	41.8848

The middle man and the shopkeepers are the ones who are the main beneficiaries of the whole system while they are neither discussed in the news nor highlighted in the media. Cell phone snatcher is the executer of the whole activity however the middleman and the shopkeepers are the people who complete the process but they are never highlighted in the policy discussions.

There are greater economic incentives for the criminals to collude with the people who are officially responsible for the reduction of these activities so that there probability of being arrested remained very close to zero (The punishment for cell phone snatching does not impose significant burden even if the probability of being arrested becomes high).

5. Recommendations and Future work

The paper poses a set of questions. For instance, what is the macro impact of cell phone snatching? Apparently, it seems like a crime worth around 50 million per year, is it really so? What are the spill over effects of cell phone snatching? Does cell phone snatching have a relationship with the other organized crimes like vehicle snatching or robbery etc? Are there any evidences of the collusion between cell phone snatchers and the anti-snatching forces? What is the economic and social cost of such collusion, if any? How can the collusion between cell phone snatchers and the anti-snatching force detected and eliminated?

The answers of these and many other questions demand extensive research on the street crimes (Which is beyond the scope of this paper). The reduction of cell phone snatching to its minimum does not necessitate additional police force or any operation against the cell phone snatchers (though both would be very helpful), what it requires is a careful review of the systematic process of cell phone snatching and the structural changes in the policing system. There is a need to significantly increase the legal cost of executing and supporting the cell phone snatching. Without doing such an action like this, the activity would keep attracting the new criminals to begin their crime journey with this activity.

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