

How Nonmarket Participants Cause Market Failures: A Conceptual Perspective

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ABSTRACT

Existing theories of market failure hinge on the premise that only market participants can cause a market failure, implying thereby that nonmarket participants cannot. Nonmarket participants are individuals, businesses, and governments that engage in any activities outside a market transaction; such activities include charity giving, Internet hacking, and corporate lobbying. The goal of this paper is to show that nonmarket participants can cause a market failure. It first explores the theoretical basis of nonmarket participants as a source of market failure. Then the paper estimates the effects of lobbying and Internet hacking on the U.S. banking and e-commerce sectors.

INTRODUCTION

An efficient market is based on the theory of perfectly competitive equilibrium. The perfectly competitive equilibrium is directly related to the state of Pareto-optimality in economics. Pareto-optimality implies a state of equilibrium where no move can be made to make one person better-off without making someone else worse-off. However a market does not always work according to the perfectly competitive theory. When a market fails to work perfectly or efficiently, it results in a market failure.

In the literature, the term for the theory which deals with the allocation of resources under a state of a market failure is the "second-best theory," the vital assertion of which is that a market failure occurs if there is any deviation from the assumptions of perfectly competitive equilibrium. This means that any single deviation from the assumptions of the perfectly competitive equilibrium is synonymous to a market failure. Such deviations (Lipsey et al, 1965-67) include the following: existence of monopoly (single seller) or monopsony (single buyer) power of one household over others in the economy; the presence of externalities and public goods; informational asymmetries most commonly found in the context of uncertainty having different impacts on different households; savings, which is excluded in the pure competition model; price regulation by government can cause enormous dislocations in the perfectly competitive model; an important sector of inefficiency in any national economy-the defense sector is outside the market sector; no unemployment of resources is foreseen in the perfectly competitive model.

There are two key ways that the deviations can occur. One, they can occur due to the vagaries of nature (Michel-Kerjan, E.O., 2010), for example, flooding or droughts can cause economic collapse. Other than that, conceptually speaking, the only other way the deviations can occur is due to the activities

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of individuals, businesses, and governments occurring when they are engaging in a market transaction or outside a market transaction. Next, having clarified the theoretical root of market failure, the author reviews the literature to find out how the topic of market failure is being covered.

BRIEF LITERATURE REVIEW

I. MARKET PARTICIPANTS AS CAUSE OF MARKET FAILURE

A review of the available literature reveals the following theories of market failure: creative destruction, market power, distortional prices, informational asymmetry, public goods, government failure, inequality of income, and market externalities. The creative destruction refers to the hypothesis that the creation of new products, production methods and management techniques by competing firms simultaneously makes existing markets obsolete, ultimately resulting in market failures. (See: Caplan, 1996; Thesmar et al, 2000). Having a market power can cause a market failure (Mankiw, 2004) if a firm sets a higher price for its product and still remains in the market. This means that the firm which possesses the market power is the cause of a market failure. A price distortion can cause a market failure because, if a price is slow to adjust (Sheedy, 2007) and (Mankiw, 1985) the coordination of demand and supply can break down. Further, an informational asymmetry can occur (Stiglitz, 2000) if a buyer or seller has much more information about a product than the other market participant. The mere existence of public goods in the economy implies a case of market failure (Sexton, 2011) because sellers would not invest in a market in which there is no effective way of excluding a person from the benefits associated with consuming of the product.

A government is considered a market participant because it performs market-related and systemic roles in the economy. A government failure occurs when it fails to efficiently perform the assigned roles. The text (Case et al, 2008) covers issues of government failure extensively. Market externalities (McConnell et al, 2009) can occur if market participants impose extra costs or extra benefits on a third party or bystander. The lack of equitable distribution of income in the economy (Stiglitz, 2013) can cause a market failure. The above review shows that existing theories of market failure hinge on the premise that only market participants can cause a market failure; this contrast markedly with the conceptual viewpoint that nonmarket participants too can cause a market failure.

II. NONMARKET PARTICIPANTS AS CAUSE OF MARKET FAILURE

To better reflect how nonmarket participants affect a market, instead of using the term market failure, the rest of the discussion focuses on the novel concept of market internality¹ which is a term coined by the author to represent any market failure caused by nonmarket participants. Market internalities can manifest in the economy in two ways: negative and positive.

NEGATIVE INTERNALITIES

Negative externalities occur when nonmarket participants affect the efficient allocation of resources by imposing extra costs on a market while engaging in any activities outside a market transaction. An example of activities that can cause a negative externality is Internet hacking. According to Google's management, the search-engine firm considered pulling out of China because of the activities of hackers in China. If Google were to make real this threat, according to (Hogg, 2010) the search-engine market in China may drop by more than 25% which is more or less the ratio of the market controlled by Google in China. Yet another example of negative externality can be the activity of corporate lobbyists. Many interest groups spent millions of dollars lobbying for or against the U.S. health care bill. For example the U.S. Chamber of Commerce spent an amount of \$62.2 million opposing the passage in 2010 of the U.S. health care bill. These diverse groups engage in lobbying only because they expect to receive some benefits that they cannot get through the market.

NEGATIVE INTERNALITIES

FIGURE 1.2: shows how negative externalities affect efficient allocation of resources in a market:

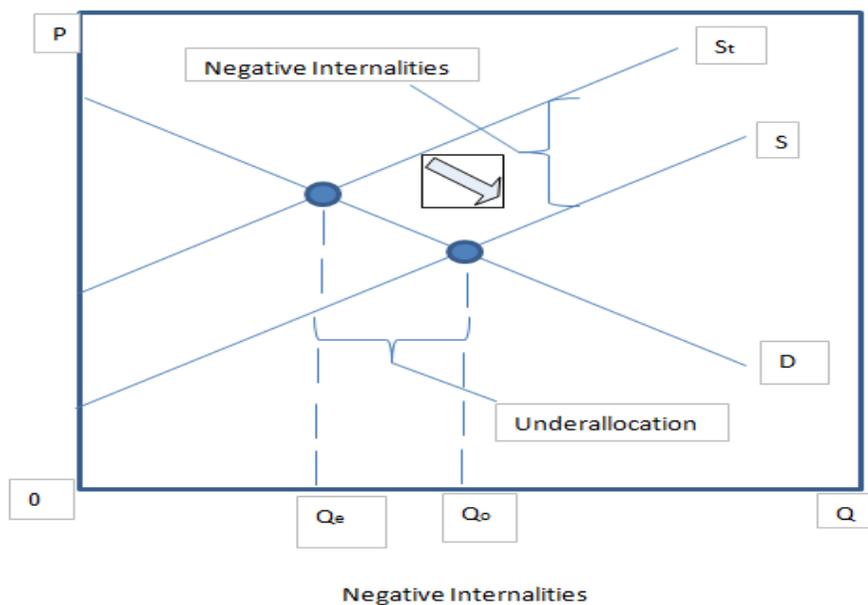


Figure 1.2 shows that when a firm incurs some extra costs resulting from a nonmarket participants, the supply curve S_t lies farther to the left (or above) than it would if the extra costs resulting from negative externalities were not taken into account. This means that S_t includes extra costs from a nonmarket economic agent and S does not. The market supply reflects both direct private costs and extra costs and therefore overstates total costs and understates total benefits. The outcome is shown in **Figure 1.2** where equilibrium output Q_t is less than optimal output Q_o . The result is that the market under produces the good or service, and resources are under allocated. The price of the good is too high and the output of

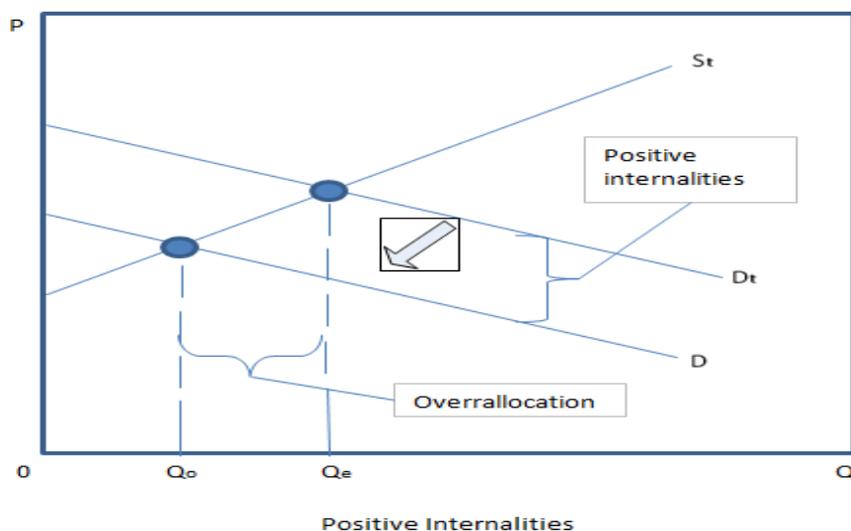
the good is too low to be at efficient-market level Q_0 . As a result, market failure occurs in the form of under allocation of resources to the production of the good.

REMEDIES TO NEGATIVE INTERNALITIES

There are three distinct ways to correct the market disequilibrium associated with negative internalities. First, affected entities can buy insurance policies against exposure to market-externality problems. There is a similar suggestion (Michel-Kerjan, 2010) in a recent article, discussing how to use the insurance tool to contain catastrophic events such as natural disasters and acts of terrorism. Second, a special legal platform, which might operate in the same way as the U.S. small-claims court, should be put in place for entities facing the challenges of negative externality. According to (Glaeser et al, 2011) the efficacy of whether to use a legal or a regulatory platform should depend on the incentives facing judges and regulators. Third, government can extend tax holiday, subsidies, or direct controls to compensate entities facing problems of negative externalities.

POSITIVE INTERNALITIES

FIGURE 1.3: shows how positive internalities affect efficient allocation of resources in a market:



Positive externalities occur when individuals, business, and governments affect the efficient allocation of resources by imposing extra benefits on a market while engaging in activities outside a market transaction. An example of activities that can cause a positive externality is the impact of development assistance rendered by developed nations' agencies to developing countries. In Haiti, USAID recently helped trained 1000 bee farmers who had earlier abandoned the trade, so that they could return to raising bees to earn a living. What the USAID Farmer to Farmer Program, administered by Partners of the Americas, did was teach Haitian beekeepers "hive construction, including size of the main structure, lids and proper wood sources... after the Farmer to Farmer program began its work, more than 1,000 beekeepers returned to raising bees and more than 300 hives were restructured. Honey production has

increased from three to seven gallons per hive, generating significant income for Haitian beekeepers. In addition, beekeepers are now communicating with each other and forming beekeeping associations, recognizing the need to organize in order to increase profits and reduce costs.”

POSITIVE INTERNALITIES

Figure 1.3 shows that when a business earns some extraneous benefits resulting from the activities of nonmarket participants, the market demand curve D_t lies more to the right (or above) than it would if the extra benefits were not taken into account. This means that D_t includes extra benefits from the activities of nonmarket economic agents and D does not. The market demand reflects both the private and extra benefits and therefore overstates total benefits and understates total costs. The outcome is shown in **Figure 1.3** where equilibrium output Q_t is larger than optimal output Q_o . The market over produces the good or service, and resources are over allocated. The price of the good may be high, the same or low, depending on the exact source of positive externalities; and the output level may be too high compared with the efficient-market level Q_o . Thus, a market failure can occur in the form of over allocation of resources to the production of the good.

REMEDIES TO POSITIVE INTERNALITIES

There are two distinct ways to restore market equilibrium should the positive externalities persist in a market. First, government can adopt the tactics of “moral suasion” by encouraging individuals or firms to invest some of the extra benefits in vital societal ventures. Second, government may impose one-time taxes on the individuals or firms that enjoy extra benefits and then use the revenues to fund vital societal ventures.

A FRAMEWORK FOR ESTIMATING NEGATIVE INTERNALITIES

(a) REGRESSION ANALYSIS, THE PROCEDURE:

The regression analysis also referred to as the method of least square, according to businessdictionary.com, is a statistical approach to forecasting change in a dependent variable on the basis of change in one or more independent variables. Relationships depicted in a regression analysis are however associative only, and any cause-effect (causal) inference is purely subjective. The process involves fitting a curve or straight line to data points, in a manner such that the differences in the distances of data points from the curve or line are minimized. With one independent variable, referred to as linear regression, the best-fitting line can be interpreted by the formula for determining a slope,

$Y_t = a + bX + e$; where Y is the observed score on the dependent variable, a is the intercept, b is the slope, X is the observed score on the independent variable, and e is the error or residual.

In the case where the number of independent variables is more than one, the linear regression equation can extend into such a multiple regression equation: $Y_t = a + b_1X_1 + b_2X_2 + \dots + b_kX_k + e$; where there are independent variables (k s) and a slope for each (b s), one error (e) and one intercept (a).

The multiple regression hypotheses are these: HO: $b_1 = b_2 = \dots = b_k = 0$; HA: At least one b is not zero

(b) REGRESSION ANALYSIS:

LOBBYISTS AND INTERNET HACKERS VERSUS U.S. BANKING AND E-COMMERCE SECTORS

Lobbyists according to the Center for Responsive Politics, make campaign contributions to elected officials and candidates, companies, labour unions, and other organizations spend millions of dollars each year to lobby Congress and federal agencies. Some interests retain lobbying firms, many of them located along Washington's legendary K Street; others have lobbyists working in-house. The total spending by lobbyists in 2012 was \$12.47.

Internet Hackers according to an independent study conducted by the Ponemon Institute are mainly motivated by financial fraud, followed by customer data theft, and disruption of business operation. The losses resulting from cybercrime include costs of complying with consumer notification laws; costs of providing credit monitoring for affected individuals; costs of responding to any government investigations and any resulting fines; costs of the loss of intellectual property and damage to, or suspensions of, their online systems and resulting business interruptions; and costs of litigation, as well as potential judgements or settlements, in connection with third-party lawsuits brought by persons whose data has been compromised. In 2012, the Institute reports that the average annualized cost of cybercrime for 56 benchmarked U.S. firms range from \$1.4 million to \$46 million per year.

The U.S. banking and e-commerce sectors have undergone tremendous change in the last two decades. Notable factors that have driven the change are as follows: the Savings & Loans crisis of the early 1990s, the repeal of Glass-Steagall Act in 1999, terrorist attacks in 2011, fierce competition due globalization and deregulations, outsourcing, challenges to operating online, and the financial crisis of 2007. During this period, there has been noticeable increase in the operating expenses for the two sectors, so it is of interest for the benefit of this study to find out how lobbyists spending and costs associated with Internet hacking contributed to the operating expenses in both sectors. The author uses the MINITAB software to perform a multiple regression analysis on ten years of data to determine the significance of lobbyists' spending and costs of Internet hacking on the operating expenses for the U.S. banking and e-commerce sectors.

In Tables 2, the regression equation is this: $\text{Operating Expenses} = 5.98E+11 - 731 \text{ Lobbyists} + 1630653 \text{ Hackers}$. The Operating Expenses variable, dependent variable, is dependent on independent predictors that are, $X_1 = \text{Lobbyists}$, $X_2 = \text{Hackers}$. This regression equation indicates therefore a negative relationship between Operating Expenses and Lobbyists' spending, and a positive relationship between Operating Expenses and the Hackers' costs. Thus, a negative coefficient of 731 implies that for every increase in one percent increase of Lobbyists' spending the operating expenses of the banking and e-commerce sectors decrease by \$731 thousands; the positive coefficient of 1630653 indicates that for every increase in one percent of Hackers' costs the Operating Expenses would increase by \$1630653;

while the Operating Expenses would increase by a factor of \$5.98 billion if the predictor variables are kept constant.

TABLE 1: Annual Spending by Lobbyists, Costs of Hacking, and Operating Expenses for U.S. Banking & E-Commerce Sectors

| YEAR | LOBBYISTS ¹ | HACKERS ² | OPERATING EXPENSES |
|------|------------------------|----------------------|----------------------|
| 1999 | \$35,717,141.00 | \$10,000 | \$515,280,882,000.00 |
| 2000 | \$94,410,642.00 | \$265 | \$595,699,451,000.00 |
| 2001 | \$39,507,903.00 | \$378 | \$576,905,570,000.00 |
| 2002 | \$80,522,72.00 | \$456 | \$520,443,892,000.00 |
| 2003 | \$50,019,601.00 | \$55,000 | \$499,136,684,000.00 |
| 2004 | \$105,807,024.00 | \$52,600 | \$507,332,148,000.00 |
| 2005 | \$60,703,321.00 | \$867 | \$618,257,619,000.00 |
| 2006 | \$106,493,108.00 | \$100,870 | \$744,964,897,000.00 |
| 2007 | \$86,890,170.00 | \$120,410 | \$956,764,549,000.00 |
| 2008 | \$157,434,205.00 | \$237,400 | \$798,493,334,000.00 |
| 2009 | \$94,425,852.00 | \$150,660 | \$807,274,512,000.00 |
| 2010 | \$142,986,936.00 | \$164,420 | \$717,391,065,000.00 |

The value represents the lobbyists' annual contribution to the financial and retail sectors.

The value represents costs of hacking and protection by mainly financial and e-commerce sectors.

The value represents the annual operating expenses for the U.S. banking and e-commerce sectors.

TABLE 2: U.S. Banking & E-Commerce Operating Expenses versus Lobbyists, Hackers, 1999-2010 Regression Analysis

| PREDICTOR | COEF | SE COEFF | T | P |
|-----------------------|--------------|-------------|-------|-------|
| Constant | 5.977333E+11 | 97114793111 | 6.15 | 0.000 |
| Lobbyist | -0.731 | 1.446 | -0.51 | 0.625 |
| Hackers (in millions) | 1630.7 | 688.6 | 2.37 | 0.042 |

S = 110491521; R-Sq = 54.5%; R-Sq (adj) = 44.4%

OPERATING EXPENSES = 5.98E+11 - 731 Lobbyists + 1630653 Hackers

TABLE 3: U.S. Banking & E-Commerce Operating Expenses versus Lobbyists, Hackers, 1999-2010 Analysis of Variance

| SOURCE | DF | SS | MS | F | P |
|-------------------|----|-------------|-------------|------|-------|
| Regression | 2 | 1.31642E+23 | 6.58208E+22 | 5.39 | 0.029 |
| Residual Error | 9 | 1.09875E+23 | 1.22084E+22 | | |
| Total | 11 | 2.41517E+23 | | | |
| SOURCE | DF | Seq SS | | | |
| Lobbyists | 1 | 1.28517E+23 | | | |
| Hackers (in mln.) | 1 | 3.12432E+21 | | | |

TABLE 4: U.S. Banking & E-Commerce Operating Expenses versus Lobbyists, Hackers, 1999-2010 Unusual Observation

| Obs | Hackers | Operating Expenses | Fit | SE Fit | Residual | St. Resid |
|-----|---------|--------------------|-------------|-------------|-------------|--------------------|
| 9 | 120410 | 9.56765E.11 | 7.30529E.11 | 45779484067 | 2.26235E.11 | 2.25R ¹ |

¹R denotes an observation with a large standardized residual.

The coefficient of determinant R2 can be used to predict how accurate and fit the derived regression equation is for the data. The value of 54.5% indicates that 54.5 percent of the changes in Operating

Expenses are explainable by the- independent predictors- Lobbyists' spending and Hackers' cost. This means that about 45.5% of the volatility of the Operating Expenses cannot be explained by the predictor variables. The adjusted R² measures how well the regression equation fits the data, because the R² tends to over estimate the strength of the association. The value of the adjusted R² is 44.4% as against the 54.5% for R². The p-value for the predictor variable Hackers is 0.42 indicating that the variation in Operating Expenses is significant at the 5% level. Thus the null hypothesis that the Hackers have no effect of Operating Expenses is rejected. The P-value for the predictor variable Lobbyists is 0.625 indicating that there is weak evidence, for the alternative hypothesis, that the predictor contributes to the variation in Operating Expenses during the period.

The weak effect of Lobbyists' spending on Operating Expenses recorded in this test can be misleading, because the activities of lobbyist have significant effect. A recent study (Alexander et al., 2009) estimates that U.S. firms lobbying for a tax holiday have a return in excess of two hundred and twenty dollars (\$220) for every dollar spent on lobbying. In Table 3, the Analysis of Variance, the F-statistic is compared with 2 and 9 degrees of freedoms and has a value of 5.39. As a result, the value of P-value is 0.029 indicating that there is evidence to suggest that at least one of the predictors is non-zero; as shown in Table 2, above, the significant predictor of the two is Hackers. In Table 4, the Unusual Observations in the dataset has a value of 9 which indicates a high leverage (influence on the regression estimates) and a large standardized residual².

CONCLUDING REMARKS

The above study showed that the existing theories of market failure in the literature hinge on the premise that only market participants can cause market failure. This means that unless individuals, businesses, and governments are directly engaged in a market transaction they cannot cause a market failure. The study showed that nonmarket participants can cause a market failure too, because, by definition, a market failure can occur if there is any deviation from the assumptions of the perfectly competitive equilibrium. The concept of market internality, instead of the generic term of market failure, which capture more appropriately the way nonmarket participants affect a market, was used in the discussion proper; two types of market internality are a negative and positive internality representing a market failure occurring when nonmarket participants impose extra costs or benefit on a market, respectively. To show how nonmarket participants cause a negative internality, the study employed the multiple regression analysis to estimate the effects of lobbying and Internet hacking on the U.S. banking and e-commerce sectors, between 1999-2010.

In sum, further research on this topic area should be encouraged for there is a vital link between a good understanding of the topic of market failure and effective management of the market economy. This means that the knowledge of market failure can help improve the effective management of the economy. It is in this regard that this study may turn out to be potentially beneficial.

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ENDNOTES

1. Unlike the term of market externality which conveys the idea that activities going on in a market can impose extra costs or benefits on a bystander, the concept of market internality conveys the idea that activities occurring outside a market can impose extra costs or benefits on a market.
2. The author can provide the histogram, graphs, and separate tests run on individual predictor variable.

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SOURCES OF DATA ON INTERNET HACKING

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