

TRASH COLLECTION EFFICIENCY AND CONSUMER KNOWLEDGE: MUNICIPAL
TRASH COLLECTION IN MANHATTAN, KANSAS

by

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Abstract

The provision of services in a community is often taken for granted, or done the way things have always been done. It is sensible to examine those practices to see if the system in place is advantageous to all parties involved. This paper examines the forms of municipal trash collection used in the United States and specifically Manhattan, Kansas. This examination includes a literature review of forms of solid waste collection and how informed vs. uninformed consumers act when purchasing goods and services. The specific traits of seven municipal trash service providers in Manhattan are analyzed. The findings of this project include a spread in prices that economic theory alone may not explain. These findings, supported by literature, would suggest that there is a breakdown in the transfer of information between service providers and consumers.

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Chapter 1 - Introduction

When Adam Smith defined the policy of laissez faire, literally “leave it alone,” economics, his vision was that consumers and producers could work out how to allocate resources and distribute income without government interference. Schiller (1996) argues in *Essentials of Economics* that government regulation is “likely to cause more problems than it could hope to solve” (p. 70). Using this theory, the method in which residents of Manhattan, Kansas choose their own trash collection provider, seems appropriate.

Manhattan, Kansas is the county seat of and largest city in Riley County. The 2009 U.S. Census Bureau estimate population for the city of Manhattan is 52,836 (*2009 population estimates*. 2009a). Riley County’s 2009 estimated population is 71,341 (*2009 population estimates*. 2009b). The U.S. Census Bureau lists seven firms in Riley County in the category waste management and remediation services. In 2002 data, those seven firms were reported to have sales, receipts, or revenue totaling \$7,584,000; an annual payroll of \$1,724,000; and 48 employees (*Selected statistics by economic sector, sub-sector, industry group, NAICS industry, and U.S. industry: 2002*. 2002).

Contrary to Smith’s intention, in a study of 77 U.S. cities, Edwards and Stevens (1978) found that in cities with more than 41,000 residents, residents could save up to 41 percent by a municipality contracting with one trash provider. This savings is from economies of scale and economies of contiguity. They went on to say that economies of contiguity alone should result in a savings of 10 percent. Ohlsson (2003) states, “The main problem in the provision of refuse collection was that public policy-makers did not minimize costs, not that public firms were less efficient than private. They were not” (p. 471).

Five trash haulers advertise as serving the city of Manhattan in the yellow pages of the AT&T phone book (*AT&T real yellow pages - Manhattan Junction City area*. 2010). Knowing weekly trash pickup is essentially a substitute good, or that if the price of one company goes up, the demand for others’ services should go up, raises the question of why multiple firms are able to operate in Manhattan. If consumers base choices solely on price alone, one firm should be able to dominate the market by capitalizing on economies of scale and contiguity.

This study examines literature to determine how customers choose service providers. Continuing the focus on consumers, the study asks if there is a lack of clear price information

provided to consumers in Manhattan. Studying literature, comparisons of differing structural methods of collecting municipal refuse are made. Finally, to compare cost of service, a census was taken of all Manhattan municipal refuse collection service providers.

If there is not a pricing difference among service providers, then residents are choosing a provider based on other reasons. These reasons could be familiarity with the business or for access to additional services. There are more efficient ways to collect municipal trash than what the city of Manhattan is currently using; multiple service providers covering the same areas is not the most efficient means of collecting residential municipal trash. If there is a pricing difference, residents are choosing their service providers because of additional services or a lack of transparency to pricing information.

In exploring these questions, there is the possibility that service provider prices are close enough to the same as to not be considered different. If there is a price difference, the fact that residents of Manhattan continue to choose different providers illustrates that other factor may be involved in the selection process. Nicholson (2000) theorizes in *Intermediate Microeconomics and Its Application* that, in a perfectly competitive price system, individuals maximize utility, firms maximize profits, there is perfect information about prices, and every economic actor is a price taker. Under the law of one price, with perfect information and no transaction costs, goods must trade at a single price in the market. He states that under this law,

A good trades at the same price no matter who buys it or which firms sells it. If one good were traded at two different prices, people would rush to buy the good where it was cheaper, and firms would try to sell all their output where the good was more expensive. (p. 374)

If Nicholson's description of a perfectly competitive price system does not exist in Manhattan, it may be that there is not perfect information about prices or that people may value their time more than the cost of discovering prices.

Chapter 2 - Literature Review

Forms of Municipal Solid Waste Collection

The city of Manhattan, Kansas does not provide residential municipal trash collection as a city service. Residents can contract with one of the service providers licensed by the city or self-haul their refuse to the local transfer station. Burning trash inside Manhattan city limits is not permitted by city ordinance (City of Manhattan, 1992). In the continuum of forms of trash collection defined by Edwards and Stevens (1977), this puts Manhattan in the licensed form of trash collection (Table 2-1).

Table 2-1. Institutional arrangements for collection of municipal solid waste (Edwards & Stevens, 1977).

Full municipal service	Contract	Franchise	License	Unregulated
Publically owned	Privately owned			
Municipality provides trash collection services to all residents and either bills residents directly or collects money for service through other taxes.	Municipality selects and directly pays a collection firm to provide trash collection services to all residents.	Municipality selects a collection firm to provide trash collection, usually at a set price, but does not provide billing services and participation is not mandatory.	Municipality requires collection firms to hold a license from the municipality and may or may not regulate price.	Municipality does not require collection firms to hold a municipal license and does not regulate prices.

How a municipality's trash service is structured is important to consumers because of service and price concerns. Ohlsson, Edwards and Stevens, and Stevens found that trash collection is most affordably offered when companies can maximize economies of scale and contiguousness. The more consumers a service has in one area, the more resources that company can put into serving that area (Ohlsson, 2003) (Edwards & Stevens, 1977) (Stevens, 1977). There is not a consensus about which form of trash collection in Edward and Franklin's continuum is best for consumers. Specifically, there is debate about public and private ownership. Ownership refers to who owns the capital assets and employs the labor of an operation. In Edward and Steven's continuum, "full municipal service" would be the only publically owned arrangement. Contract, franchise, license, and unregulated systems are all privately owned, but operate with different levels of government involvement.

Using 1986 data on the 500 largest nonfinancial corporations in Canada, Vining found public enterprises are most efficient when they are owned privately. He presents an argument that says private enterprises are more efficient because they operate under threat of being taken over by more efficient firms and firms who fear being taken over will find new ways to operate more efficiently. This threat does not exist in publicly operated enterprises. An exception to this is if the government is prepared to award contracts to private firms, then public firms act as private firms (Vining & Boardman, 1992). Stevens (1977) acknowledges that when a municipality provides a service, government acts as a monopoly, removing the competitive incentive. Firms are described as monopolies when they are the only producer of a good or service. Governments often act as monopoly providers, or license others to act as monopoly providers. Water, cable television, electricity, and natural gas services are examples of governmentally sanctioned monopolies.

Vining and Boardman (1992) examined literature concerning ownership of refuse collection and found only one author who said public corporations were more efficient, while finding three who said ownership did not make a difference and nine authors who said private corporations were more efficient.

There are three factors that create a situation where it is possible that municipal trash collection operations can operate at a lower cost than privately owned operations. Tax structures create differing conditions between public and private operations. Municipalities do not pay corporate income taxes and may not pay sales taxes on capital equipment. In a municipally run

operation, the city does not have to charge the customer to recover property taxes paid. If municipalities provide other services in a community, such as water, they can combine billing costs with other utilities, lowering personnel and mailing costs. Finally, municipalities are not expected to earn a profit on services they provide (Stevens, 1977).

Depending on the size of the community, private firms are able to take on trash collection in other areas to gain efficiencies of scale. Private firms may service several adjacent communities and treat them as a unit, creating a market larger than the city itself (Stevens, 1977). This concept would allow a firm such as Waste Management to use its trucks and operators to service Manhattan during certain days of the week, while using those resources to service other nearby communities on other days of the week. Forming larger markets out of nearby markets allows private firms to create an economy of scale, making more efficient use of their capital equipment. By servicing more customers with the same amount of capital equipment, firms are able to lower the average cost of the equipment. This meets Schiller's (1996) definition of an economy of scale by reducing the minimum average cost through increases in size.

Performance measures for trash collection include the amount of refuse collected and the efficiency with which it is collected. For example, a 32-cubic-yard compactor truck was reported to be able to collect 12.66 tons per 8-hour shift (Ammons, 2001). Because municipalities normally do not operate outside their city limits, needs for the ability to collect small increments beyond the 12.66 tons per shift may become expensive. Because the 13th ton, an amount larger than one truck operating for one shift can provide, requires additional capital investment in an additional truck and a crew, the marginal costs for collecting that waste is high. In the case of a municipality that normally does not expand its trash collection services outside its borders, the marginal product of capital, the extra output from purchasing another truck, would be low in this example.

Although Vining found that private firms operate more efficiently, Stevens states that exclusivity, or providing all of a mandatory service in an area, should lead to efficiency. An organization that services all customers in a defined area will be more efficient than one which services only some of the customers because the latter arrangement prevents the realization of any economies of contiguity. In a study of 315 U.S. cities, Stevens (1977) also found when holding size and service level constant, costs of private collection were always as great or greater than costs of municipal or contract collection. Stevens grouped the 315 cities into three groups

for this study: those with municipal collection; those where a private company collects under exclusive contract with the city; and those where residents hire a private firm of their choice or self haul. For comparison, communities were grouped by population of fewer than 10,000; 10,000 to 50,000; and more than 50,000. In another paper, Edwards and Stevens (1977) examined data from 77 U.S. cities that all have once-a-week, curbside service. To control variables, Edwards and Stevens required input from both municipalities and collectors in their examination of trash collection in cities with private collection systems. They found that the most efficient system was the contract system, which allows municipalities to contract with a private firm, make collection mandatory, designate sections of the city to the firm, and set prices in a contractual agreement. Overall, they found that the prices households pay in noncontract cities are at least 41 percent higher than in contract cities. Again, they contribute these savings to economies of scale and economies of contiguity that are created when government intervenes and allocates contiguous areas of trash collection.

Studying 77 U.S. cities providing some form of private trash collection, Stevens found that in cities with a population of more than 50,000, contract services operated in a manner that seemed to be more efficient and provide service at a lower cost. Contract services operated with a smaller crew size. Municipal operations had an average crew size of 3.26, while contract services had average crew sizes of 2.15. Contract services operated larger equipment. Contract services used trucks that averaged 27.14 cubic yards, while municipal crews used trucks that averaged 20.63 cubic yards. Contract operation also used a higher percentage of up-to-date trucks with features such as front or side load. 44 percent of contract crews used this equipment while only 13 percent of municipal crews did (Stevens, 1977).

Affirming the idea that it is not ownership of a service that determines efficiency, Ohlsson (2003) found in a study of 115 Swedish municipalities that public production was, on average, 6 percent cheaper than private production. He goes on to state, “the important conclusion is, therefore, that the main problem in the provision of refuse collection was that public policy-makers did not minimize costs, not that public firms were less efficient than private. They were not” (p. 471). In Ohlsson’s study, public and private providers had exclusive rights to the area they covered; proving economies of contiguity.

Edwards and Stevens (1978) touched upon a variable that trash collectors have little control over, the size of the community they serve. They stated that evidence on economies of

scale in refuse collection suggest that there are important economies of scale over small collector size ranges. In cities with populations of less than 50,000, a single collector may be the most efficient arrangement.

Informed Consumers

The utility of residential trash collection for a consumer is high at one unit, but the marginal utility of additional service would be much lower. Utility in this case is defined as the satisfaction from purchasing the service of home collection of trash. Considering the time commitment of self-hauling trash, there is a convenience to consider when paying to have trash picked up at a residence. Unlike other products, there is little marginal utility to purchasing more of the service. Marginal utility is the change in satisfaction from purchasing additional service (Schiller, 1996).

The selection of a residential trash collection service provider has characteristics that differentiate it from other products examined in literature, yet many comparisons still apply. Unlike many purchased items in literature, residential trash service is a service that is provided at a consumer's residence, so travel time to compare products, which is considered as cost, does not directly apply. In this case, the consumer's time spent to discover prices substitutes for travel time. The idea of perfect information in economics assumes that consumers know all the information about firms' prices and quality. There is a real cost of calling firms or asking friends or neighbors to obtain pricing and quality information. If information about firms is difficult to obtain, the cost of the search for that information is higher (Wolinsky, 1984). The cost of finding information is considered a transaction cost, which is the cost of making market transactions and of gathering information with which to make those transactions (Nicholson, 2000).

Schultz (2004) argues that, "Increasing consumers' information about prices *and* product characteristics makes the market more competitive so equilibrium prices decrease for given product characteristics" (p. 173). Schultz states that this effect diminishes if companies differentiate their service. If the service is similar, in this case, trash being picked up on a regular scheduled basis, consumers will seek out lower prices. Increasing pricing transparency for the consumer is good for consumers, but bad for firms. Firms rely on a portion of consumers who are uninformed to maintain an inelastic demand. Uniformed consumers are unaware of price differences and are less likely to respond to price changes (Schultz, 2004). This works both for

and against firms. Firms that raise their prices may not lose enough customers to decrease profits, but firms that lower their prices may not capture enough new customers to increase profits. Just as uninformed consumers may not leave a firm that raises prices, uninformed consumers may not know about a firm that lowers prices. Nicholson (2000) states, that if consumers do not know prevailing prices, or the information is not freely available, Adam Smith's invisible hand may not be very effective. Poor decisions based on faulty information can result in an inefficient allocation of resources.

There are limits to the benefits of differentiating products. If there are enough firms serving an area that are trying to differentiate their product, but do not make the information about the differentiation easy to find, the cost of the search may preclude customers from benefitting from that variety of services (Wolinsky, 1984). Anderson and Renault (1999) state that if a consumer perceives prices of homogenous goods to be in a state of equilibrium, they are not likely to shop around based on price as they think the cost of the search may be greater than the savings. If this condition exists, service providers can act as if they are operating in a monopoly and raise their prices with less fear of losing customers.

If firms choose not to disclose their pricing information, others may publicize that information. Newspapers often run articles or information boxes comparing pricing. This makes the market more transparent, however, not at the firms' choice. Whether it is through their own doing or not, Schultz (2005) found that increased information about pricing typically lead to lower prices. Advertising prices is only profitable for a seller if he quotes a price below the uninformed consumer's expectation. Since this is not always the case, service providers operating in a market with a lack of transparency may not want to advertise their rates (Bester, 1994).

Chapter 3 - Methodology

Prologue

Literature was reviewed to determine customer reactions to information and structural forms of providing trash service. A census was taken to examine the prices and services offered by Manhattan, Kansas trash haulers. This information allows a comparison of the providers to determine if there is a difference in services by comparing characteristics of each company and the price they charge for that service. The following section defines the description of the sample, including the unit of analysis, measurement techniques used, diagnostics, analytic strategy employed, an analytic summation and the management of the study.

Description of the Sample

For this study, municipal trash collection service providers are the unit of analysis. The city of Manhattan lists seven licensed trash haulers on the city website (Table A-1) (*Utility contact information*). It is intended to sample, or census, the whole population of municipal trash service providers in Manhattan. Residents in Manhattan have the option to haul trash to a disposal site of their preference. It is also possible that an unlicensed collector could operate in Manhattan without detection by city officials. These two possibilities are outside the scope of this work and will be ignored. An official with the city of Manhattan also will be questioned about the city's licensing structure for trash collectors.

Although this study could take a sample of the population of trash collectors serving Manhattan, the small number of providers allows for a sample of the whole population. The small number of providers also creates a situation where failing to sample all providers could leave too much uncertainty in the study.

Manhattan is an appropriate city for this study because they have a trash collection system that fits into the private provider side of the Edward and Stevens continuum. There are also enough residents to allow multiple firms to operate in the city, giving residents a choice of providers. In a city without multiple providers or one municipal provider, the concept of consumer choice cannot be measured

The sample frame for this study includes all seven municipally licensed trash collectors in the spring of 2011 in Manhattan (Appendix Table A-1).

Measurement

The areas of interest when questioning municipal trash collectors are meant to be characteristics that would set one provider apart from another. The data gathered in the survey of municipal trash providers approximate the questions a prospective customer might ask a potential service provider. If the price and service information were easily available, consumers of goods and services could make choices based on observable factors such as what types of service they want and which provider offers the service at the best price. There may also be unobservable or emotional decisions in making a purchase. This study only queries quantifiable differences between service providers, it is not questioning why consumers choose the way they do, only if differences among providers exist.

The questions asked of service providers are listed in the Appendix Table A-2. The questions with a sub-letter were only asked if the question preceding it without a letter, but the same numeral, was answered with a “yes.”

Service frequency (1) — This is a measure of how often service is available. Information should be in the form of “pickups per time period,” such as once per week or twice per week. Service frequency could be of interest to various groups including large families and high trash producing households. According to the EPA, the average American generates 4.34 pounds of waste per day and recycles 1.46 pounds of that waste (*Municipal solid waste generation, recycling, and disposal in the United States: Facts and figures for 2009*. 2010).

Frequency options (2 and 2a) — This is a measure to expand on information given in question 1. This option could be of interest to consumers who produce more trash than a container picked up once a week will hold. Information in question 2 should be a yes or no, question 2a should be the alternative number of pickups per week.

Container provision (3, 3a, 3b, and 3c) — This defines part of the service. Since Manhattan is home to Kansas State University and close to Fort Riley, a U.S. Army base, many residents are only located in Manhattan for a short time. These consumers may not want to own a refuse container, but would rather have one provided. The U.S. Census Bureau reports that

between 1995 and 2000, 31,709 people moved into Riley County, 24,922 people moved out of Riley County, and 27,639 people did not move in or out of Riley County (as cited in *Selected general characteristics of 1995 to 2000 migrants & non-movers: Riley County, KS*. 2003) In this time period, more people moved into the county than there were people who remained in the county from before 1995 and stayed in the county through 2000. The size of the container would be of interest to high-volume trash producing households. Being held responsible for lost containers could influence consumer choice. The answer to question 3a should be a volume. The answer to question 3b and 3c should be a yes or no and a dollar amount.

Number of containers (4 and 4a) — This provides more information to potentially high-trash producing households. The answer to question 4 is a yes or no. The answer to question 4b will be either the trash provider or the resident.

Excess trash (5 and 5a) — This is a quality of service measure. Consumers who regularly have items that will not fit in a trash container would be interested in this. The answer to question 5 should be a yes or no. The answer to question 5a should be a dollar amount.

Cost (6) — This is a measure of the cost of the service. This measure was used in Stevens (1977) and Edwards and Stevens (1977) as the basis of measuring cost to the consumer. The answer to question 6 should be a dollar amount per given unit of time.

Billing frequency and method (7 and 7a) — Measure of the time frame and method of payment for the service. Consumers may desire monthly bills while others want less frequent bills. The form of payment may be of interest to consumers as a convenience. The answer to question 7 should be a time period such as monthly or quarterly. The answer to question 7a should be a form of payment, such as check, credit card, or some form of electronic banking.

Contract requirement (8 and 8a) — Measure of the flexibility of service. Manhattan residents who frequently move may not want to be locked into a service. The answer to question 8 should be a yes or no. The answer to question 8a should be a length of time.

Recycling (9, 9a, and 9b) — Measure of additional service. Some consumers desire this additional service and consider it a convenience to have one source of providers. Recycling is growing in the United States, the EPA reports that in 2009, Americans recycled 33.8 percent of the trash they produced (*Municipal solid waste generation, recycling, and disposal in the United States: Facts and figures for 2009*. 2010). The answer to question 9 should be a yes or no. The

answer to question 9a should be a description of the services they provide. The answer to question 9b should be a dollar amount for a given time.

Scheduling changes (10) — A measure of convenience.

Website (11 and 11a) — A measure of how information is made available to consumers. The answers to questions 11 and 11a should be yes or no.

Pickup location (12) — A measure of convenience to consumers. The availability of a nontraditional pickup location, not at the curb, may influence consumer choice. The answer to question 12 should be a location on the property where the container should be on pickup day.

Advertisement (13) — Measure of information transfer. The literature in this study gives reasons for giving information to consumers as well as not advertising information.

Trucks (14) — This is an indirect measure of the size of the collection operation. The answer to question 14 should be a number.

Other communities (15) — Measure of market size. The literature states that private firms can create economies of scale by expanding service into other nearby markets. The answer to question 15 should be the names of any other communities served.

Table A-3 in the Appendix lists the questions asked of a Manhattan city official. The question with a sub-letter was only asked if the question preceding it without a letter, but the same numeral, was answered with a “yes.”

Number of providers (1) — Confirms the number of service providers in Manhattan, Kansas. The answer to question 1 should be a number.

Cost of license (2 and 2a) — Determines if there is a cost of entry into the market and what that price is. The answer to question 2 should be a yes or no. The answer to question 2a should be a dollar amount.

License length (3) — Determines how long a license is good for. The answer to question 3 should be a length of time.

Requirements (4) — Determines what criteria must be met to gain entry into the market. Question 4 is an open-ended question.

Oversight (5 and 5a) — Determines what role the city plays in controlling the quality of service provided from the market. The answer to question 5 should be a yes or no. The answer to question 5a is an open-ended question.

Price control (6) — Places the city more clearly on the continuum of municipal trash providers. The answer to question 6 should be a yes or no.

Renewal (7) — Determines if the city plays a role in removing providers from the market. The answer to question 7 should be a yes or no.

Analytic Strategy

This project attempts to determine if there are quantifiable differences in the cost and level of service provided by municipal trash collectors in Manhattan. Because the entire population of municipal trash collectors in Manhattan is to be surveyed, statistical analysis to describe unknown members of the population is not needed and can be replaced by a statistical description of the results of the census.

Without questioning consumers, the influence of qualitative items in the survey on provider selection cannot be ranked, only used to point out differences among providers. For instance, the location of container placement for pickup may be of greater value to a customer with mobility issues than cost savings.

Cost of service is the clear, quantifiable measure in the provider survey. Since the whole population, all Manhattan trash collectors, will be surveyed, analysis of this data will be descriptive, not inferential or predictive. To compare providers, prices, if not given on a monthly basis, will be converted to a monthly price with weekly pickup. For example, if a provider bills on a weekly basis, that price will be taken times 52 and divided by 12 to convert it to a monthly price. This data will answer the question of the difference of pricing for municipal trash collection service in Manhattan. Descriptive statistics of price data include:

Mean, or average price.

$$\mu = \frac{\sum x}{N}$$

Where:

μ = population mean

x = individual price samples

N = number in population

Median, or the mid point of the price data. The median price provides information about price while ignoring outliers in the data. The size of the population makes price data more sensitive to prices at either extreme.

Mode, the price value that occurs most frequently. The mode, or most often occurring price, serves to further inform the reader about the centrality of the price data.

Variability, or how much each price varies from the mean.

Range, or how far apart the prices are from one another.

$$r = h - l$$

Where:

r = range

h = highest price

l = lowest price

Standard deviation, or the average amount of variability in a set of prices.

$$s = \sqrt{\frac{\sum(x - \mu)^2}{N - 1}}$$

where:

s = standard deviation

x = individual price samples

μ = population mean

N = population size

The binary “yes” or “no” information from the survey of trash providers will be used to compare and contrast how different the providers are from one another. Survey data that provides qualitative information about the company also will be used to contrast with the literature review to enhance information about the trash collection system in place in

Manhattan. Statistical data describe prices and allow a picture of how companies' prices compare. Information from the city will be used to further define Manhattan's place in the continuum of municipal trash collectors.

If trash collection truly is a substitute service, where if one provider raises prices, customers would turn to a lower-cost provider, the prices of similar services should be nearly the same. Barring a difference in service, there should be a convergence upon a single price point. This study seeks to draw conclusions from price data and service descriptions; as mentioned earlier, it does not survey consumer attitudes about particular providers. The methods and information used in this evaluation apply particularly to Manhattan; however, the method could be used to assess a community with a non-municipal trash collection service. The price data that describes the providers in Manhattan may not be relevant to other communities.

Analytic Summation

In this study, the price charged for trash collection services determines a major part of the similarity of service providers. The information gained through surveying trash collection providers and a city official add information to the ideas that consumers, valuing their time, will limit price discovery searches; municipal trash providers may choose not to publically disclose their prices; and that the prices for municipal trash service, arguably a substitute good, are not the same.

Chapter 4 - Findings

Most residential trash collectors in Manhattan, Kansas provide collection services once a week (Table 4-1). The exception is B&L Trash Service, which picks up trash as requested by the customer. They did not indicate how the customer signals that they wanted trash pickup.

Table 4-1. How many times per week do you provide residential service?

Service Provider	Answer
A-1 Trash Service	1
Arrowhead Trash Service	1
B&L Trash Service	Up to customer
George Mallon Trash Service	1
Howie's Trash Service	1
Joe Mallon Trash Service	1
Waste Management	1

Most providers did not give an option of more pickups per week (Table 4-2). Again, B&L Trash Service allows the customer to decide how often trash is collected. Joe Mallon Trash Service indicated they provide extra trash pickups if requested.

Table 4-2. Is there an option to how many times a week you pick up trash?

Service Provider	Answer
A-1 Trash Service	No
Arrowhead Trash Service	No
B&L Trash Service	Yes / Up to customer
George Mallon Trash Service	No
Howie's Trash Service	No
Joe Mallon Trash Service	Yes
Waste Management	No

Joe Mallon Trash Service is the only provider that does not provide a container. Container sizes provided vary from 65-gallon to 96-gallon containers. A 65-gallon container is approximately 8.7 cubic feet and a 96-gallon container 12.8 cubic feet. Waste Management does have a deposit on their container. Replacement charges for containers vary from no charge to \$120 (Table 4-3).

Table 4-3. Do you provide a container? How large is the container? Is there a charge for the container? Is there a replacement fee for a damaged or lost container?

Service Provider	Who Provides the Container?	Size?	Container Charge?	Replacement Fee
A-1 Trash Service	Yes	96 gallon	no	\$120
Arrowhead Trash Service	Yes	70 gallon	no	\$90
B&L Trash Service	Yes	65 gallon	no	\$50
George Mallon Trash Service	Yes	96 gallon or 64 gallon	no	no charge
Howie's Trash Service	Yes	96 gallon	no	50% of cost for lost containers, no charge for damaged containers
Joe Mallon Trash Service	No container provided			
Waste Management	Yes	96 gallon	Yes	no

All of the service providers indicated that customers could have an additional trash container (Table 4-4). About half of the service providers would give the customer another container; the others allowed the customer to provide their own additional container.

Table 4-4. Can you have more than one container? Who provides the additional container?

Service Provider	More than one Container?	Who Provides the Container?
A-1 Trash Service	Yes	A-1
Arrowhead Trash Service	Yes	Arrowhead
B&L Trash Service	Yes	Customer
George Mallon Trash Service	Yes	Either homeowner or George Mallon Trash Service
Howie's Trash Service	Yes	Howie's
Joe Mallon Trash Service	Yes	Customer
Waste Management	Yes	No answer

All providers indicated they would pickup items outside of the container. Fees varied from none, to letting the driver decide, to \$10 (Table 4-5). None of the providers wanted to state an exact charge for items outside of a container. Because of the unpredictability of the size and the weight of these items, it would be difficult to have set prices.

Table 4-5. Do you pick up items that do not fit in a container? Is there an additional charge for items outside the container?

Service Provider	Pick up Items Outside Container?	Charge?
A-1 Trash Service	Yes	fee varies
Arrowhead Trash Service	Yes	fee varies
B&L Trash Service	Yes	driver decides fee
George Mallon Trash Service	Yes	fee varies
Howie's Trash Service	Yes	no charge unless habitual or excessive
Joe Mallon Trash Service	Yes	no charge
Waste Management	Yes	\$10 charge, no charge if it fits in a trash bag

Charges for trash collection service varied in three ways (Table 4-6); the first being how the rate was expressed. George Mallon Trash Service and Joe Mallon Trash Service both charge per stop, charging based on the number of times the service is rendered. The other providers charged by the month. The second difference was the actual calculated monthly charge. In this case, the per-stop rates were multiplied by 52 and divided by 12 to find the monthly rate, \$24.92 per month. The third difference was that Waste Management has additional fixed and variable charges. There is a \$35 charge to sign up with Waste Management and variable fuel surcharge and environmental charges.

Checks are the only form of payment accepted by all providers. Waste Management did not indicate that they would take cash. Others did not state that they had online or auto payments set up. Others did not take credit cards.

Table 4-6. What do you charge for trash collection service? What forms of payment do you accept?

Service Provider	Charge per Month?	Payment Accepted?
A-1 Trash Service	\$16	check, cash, auto debit
Arrowhead Trash Service	\$17	check, cash, credit card
B&L Trash Service	\$19.50	accept cash and check
George Mallon Trash Service ^a	\$24.92	cash and check
Howie's Trash Service	\$20	credit card, cash, check and have auto debit
Joe Mallon Trash Service ^a	\$24.92	accept cash and check
Waste Management	\$19 (\$35 sign-up fee, fuel surcharge fee, environmental charge)	automatic payments, check, credit card, online bill pay

^a Price given was \$5.75 per stop. Price was converted to a monthly price (see Methodology section).

The mean, or average price, for trash pickup in Manhattan is \$20.19. The median price, or price in the middle of the price distribution is \$19.50. The mode of the price distribution, the price that appears most often, is \$24.92. The standard deviation, or the average deviation from the mean price, is \$3.52. The range from high to low price service is \$8.92 per month, or about \$107 annually (Table 4-7) (Figure 4-1). The high-cost providers also provide more choices for pick up frequency (Table 4-2). To a low trash-producing household, being able to make use of the service less frequently would lower monthly costs.

Table 4-7. Descriptive Statistics for Monthly Price Information

Mean	\$ 20.19
Median	\$ 19.50
Mode	\$ 24.92
Standard Deviation	\$ 3.52
Range	\$ 8.92
Minimum	\$ 16.00
Maximum	\$ 24.92

Note: N=7

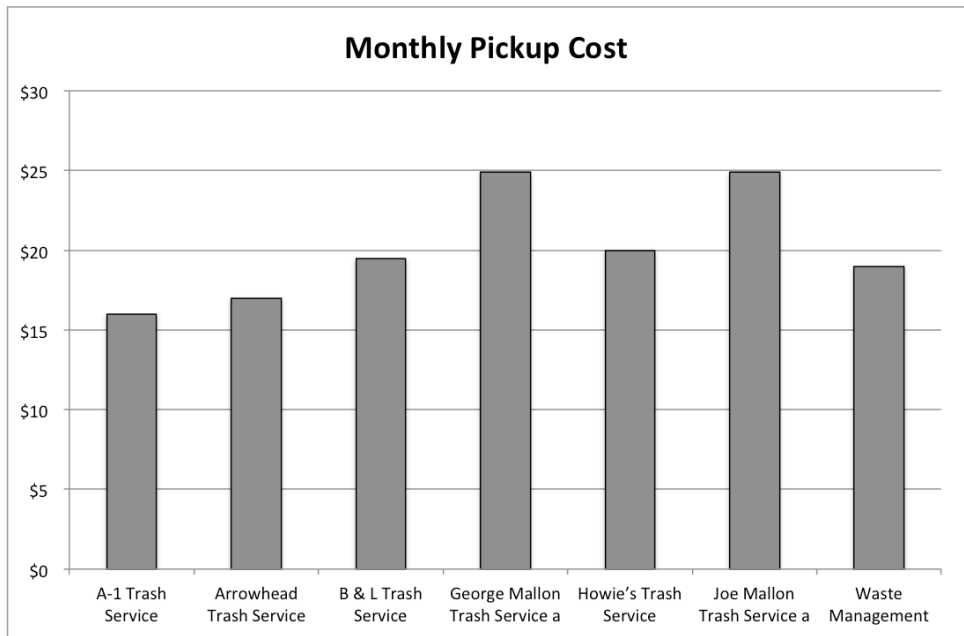


Figure 4-1. Cost per month for trash pickup.

Bill frequency was monthly, bimonthly, or quarterly. Three providers allow the customer to select their billing frequency (Table 4-8).

Table 4-8. How often is it billed? ^a

Service Provider	Monthly	Bi-Monthly	Quarterly
A-1 Trash Service	X		X
Arrowhead Trash Service	X	X	X
B&L Trash Service	X	X	X
George Mallon Trash Service		X	
Howie's Trash Service			X
Joe Mallon Trash Service		X	
Waste Management		X	

^a multiple answers indicate the customer has a choice as to how often to pay.

Waste Management is the only firm to require customers to agree to a length of service. Their service is renewed at each billing period (Table 4-9).

Table 4-9 Do you sign a contract for services? How long is the contract?

Service Provider	Contract?	Contract Length?
A-1 Trash Service	No	
Arrowhead Trash Service	No	
B&L Trash Service	No	
George Mallon Trash Service	No	
Howie's Trash Service	No	
Joe Mallon Trash Service	No	
Waste Management	Yes	Quarterly

A-1 Trash Service and Howie's Trash Service were the only two providers who offered recycling services (Table 4-10). B&L Trash Service recommended another firm.

Table 4-10 Do you offer recycling services? What services? What do you charge for those services?

Service Provider	Recycling Service?	What Service?	Charge?
A-1 Trash Service	Yes	no glass every two weeks	\$8 per month
Arrowhead Trash Service	No		
B&L Trash Service	No; (recommend another recycling dedicated firm, Go Green)		
George Mallon Trash Service	No		
Howie's Trash Service	Yes	co-mingled recycling second and fourth week of month	\$8 per month
Joe Mallon Trash Service	No		
Waste Management	No		

Schedule changes were predominately noted on the previous bill. Waste Management offers e-mail updates, Howie’s Trash Service posts their schedule on their website (Table 4-11).

Table 4-11 How do you let me know about schedule changes?

Service Provider	Answer
A-1 Trash Service	On previous bill
Arrowhead Trash Service	On previous bill
B&L Trash Service	On previous bill
George Mallon Trash Service	On previous bill
Howie’s Trash Service	Posted on website
Joe Mallon Trash Service	On previous bill
Waste Management	e-mail

Three of the service providers indicated they had websites (Table 4-12). This information was not confirmed for B&L Trash service.

Table 4-12 Do you have a website? Do you list your prices on the website?

Service Provider	Website?	Prices on Website?
A-1 Trash Service	No	
Arrowhead Trash Service	No	
B&L Trash Service	Yes	
George Mallon Trash Service	No	
Howie’s Trash Service	Yes	Yes
Joe Mallon Trash Service	No	
Waste Management	Yes	Yes

B&L Trash Service and George Mallon Trash Service indicated they would work with customers with special needs (Table 4-13). Joe Mallon Trash Service indicated they pickup trash behind the house. Areas of Manhattan have access to residential property in alleyways that trash can be picked up in.

Table 4-13. Where does the container need to be to be picked up?

Service Provider	Answer
A-1 Trash Service	Alley or at curb
Arrowhead Trash Service	Curb
B&L Trash Service	Alley or at curb; will work with customers with special needs
George Mallon Trash Service	Curb; will come to house to get elderly or disabled customer's trash
Howie's Trash Service	Curb
Joe Mallon Trash Service	Behind house or at curb
Waste Management	Curb

The method of advertising varied greatly across service providers (Table 4-14). Not all providers had their number in the Yellow Pages. Some relied on word of mouth and community activities. Two companies specifically said through their phone number on their trucks, which is also a requirement of the city.

Table 4-14. Where do you advertise your service?

Service Provider	Answer
A-1 Trash Service	Phone book, radio, weather channel
Arrowhead Trash Service	On the truck, word of mouth, and yellow pages
B&L Trash Service	On the truck, on the trash barrel, and yellow pages
George Mallon Trash Service	Word of mouth, sponsor youth sports teams
Howie's Trash Service	Online, radio, sponsorships
Joe Mallon Trash Service	Word of mouth, on trucks
Waste Management	Didn't respond

Howie’s Trash Service is the largest of the locally owned operators in terms of trucks (Table 4-15). Waste Management is the only international company serving Manhattan. Being an international company allows Waste Management to draw on a larger pool of resources for capital investment and name recognition.

Table 4-15. How many trucks do you operate in Manhattan?

Service Provider	Answer
A-1 Trash Service	Four
Arrowhead Trash Service	One in Manhattan, have two trucks
B&L Trash Service	Three
George Mallon Trash Service	Two
Howie’s Trash Service	Eight trash trucks, five roll-off trucks
Joe Mallon Trash Service	Two
Waste Management	Didn’t respond

Waste Management, being an international company, doesn’t have an answer that fit well with the question of what cities they serve. The other companies’ answers varied from seven communities to just Manhattan and the surrounding area (Table 4-16). The cities served are within a close proximity to Manhattan (Figure 4-2). The areas served range from unincorporated areas such as University Park and Keats to larger municipalities such as Wamego, which has a population of 4,274 (*2005-2009 American community survey 5-year estimates.2009*).

Table 4-16. What other communities do you service?

Service Provider	Answer
A-1 Trash Service	Ogden, Keats, Riley, Leonardville, St. George, Wamego, and Belvue
Arrowhead Trash Service	Ogden and St. George
B&L Trash Service	Riley, Leonardville, and University Park
George Mallon Trash Service	Ogden, around Tuttle Creek Lake, St. George, and Wamego
Howie’s Trash Service	Ogden and Keats
Joe Mallon Trash Service	Manhattan and country areas surrounding Manhattan
Waste Management	Didn’t respond

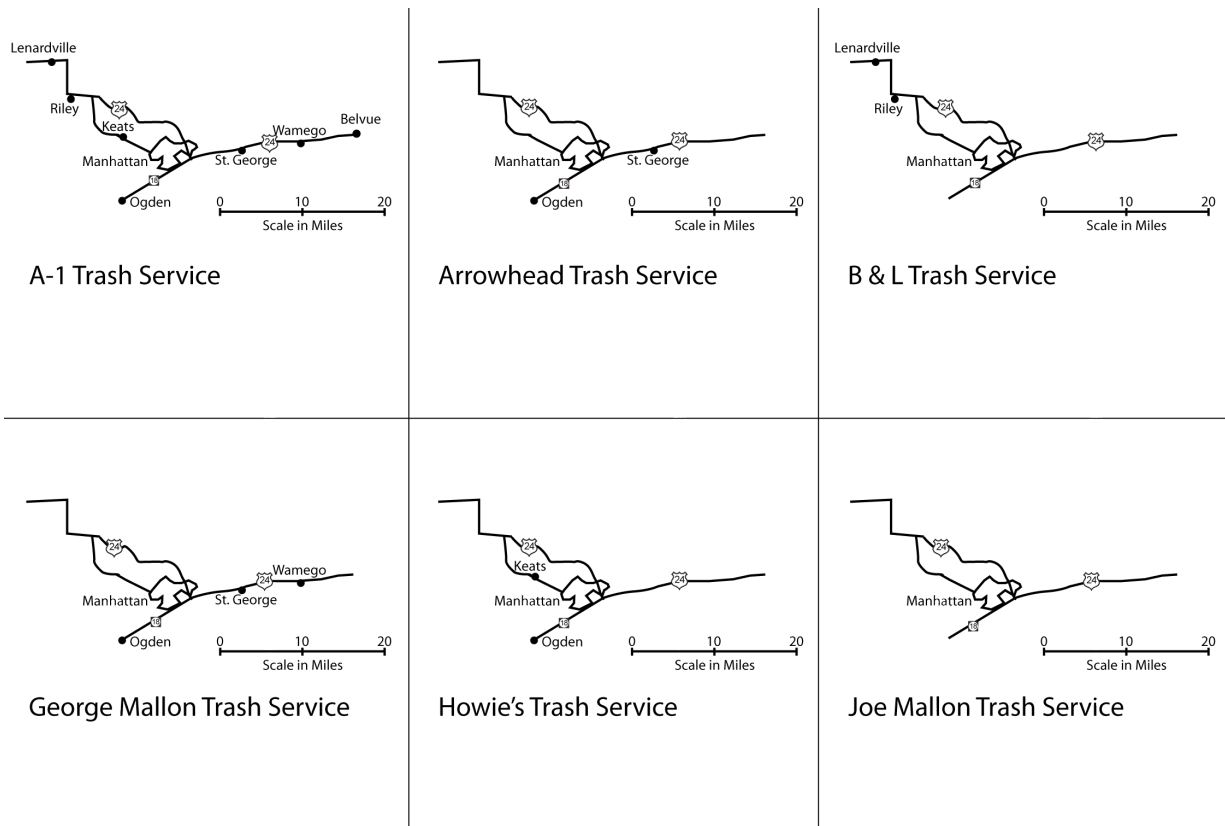


Figure 4-2. Cities served by individual service providers.

Other than charging \$50 per truck and inspecting trash trucks, the city of Manhattan did not report prohibitive regulations (Table 4-17). The contact at the city did not know of any trash service being denied license renewal.

Table 4-17. Questions for city of Manhattan official.

(1)	How many licensed providers are there in Manhattan?	Seven
(2)	Is there a charge for the license?	Yes
(2a)	What is the cost?	\$50 per truck
(3)	How long is the license good for?	One year
(4)	What are the requirements for obtaining a license to collect trash in Manhattan?	Trucks must be inspected by street department
(5)	Does the city oversee the service providers?	Yes
(5a)	If so, what manner of oversight?	Must meet city codes
(6)	Does the city regulate pricing of municipal trash collection?	No
(7)	Has the city ever not renewed a service provider's license?	Not that they knew of

Chapter 5 - Conclusion

Four questions were posed about consumers and trash collection service providers. The first, “How do residents choose service providers?” was examined in literature, not by surveying customers in Manhattan. If the law of one price were to hold true in this case, one would suspect that A1 Trash Service would be the dominant trash collector in Manhattan. Without a customer survey, it is impossible to state with certainty why consumers choose the provider that they do. Service differences that could drive consumer choice could include B&L Trash Service’s and Joe Mallon Trash Service’s feature of having pickups less frequently than once per week, providing low trash-producing households a way to save money by having fewer pickups. Howie’s Trash Service and A-1 Trash Service provide recycling, which could be an added service that encourages customers to choose their service. Finally, it could be argued that since Waste Management is an international service provider, some people choose them because they are familiar with their name.

The second question of, “Is there a lack of clear information provided to consumers?” was more fully examined. It is telling that not all service providers are listed in the Yellow Pages or have a website. Only two providers mentioned advertising on local radio; one mentioned the Weather Channel; none mentioned the local newspaper. In this case, Schultz’s assertion that uninformed customers are less likely to respond to price changes may describe the situation that exists in Manhattan (Schultz, 2004). Because the city does not report collection prices, there does not appear to be one entity creating price transparency. Consumers may think the cost of their time to search for the lowest price would outweigh the savings provided by the search.

The third question asks, “Are there more efficient ways to collect municipal refuse?” This study attempted no analysis of the trash collection firms’ business models. Literature suggests that Manhattan is missing out on the opportunities provided through economies of scale and contiguity. This is confirmed through Edwards and Stevens (1978) findings that residents in cities that contract with one provider save up to 41 percent.

Government intervention is sometimes indicated by a market failure, or a failure to produce the best possible mix of output. It could be argued that if service providers could gain

efficiencies and lower their costs, they could remain equally profitable while allowing consumers to spend the money saved on other goods or services.

Is there a market failure? Should government even be involved? Ohlsson (2003) finds that there is a reason for government to become involved, stating:

Consumption of collection service is rival and exclusion is possible. The reasons are general health and sanitation. Externalities exist because individuals are jointly damaged by deteriorations in the environment when some individuals choose low (or no) levels of collection services. The deteriorations are characterized by indivisibilities and exclusion is difficult or impossible. (p. 455)

There are possible degrees of city involvement that would make trash collection in the city of Manhattan more efficient. As stated, a city takeover of trash collection may not be the most efficient (Edwards & Stevens, 1978). The city could oversee bidding for the right to provide a franchise service. This would allow providers to gain efficiencies through contiguous service and should lower rates for residents. Any involvement by the city would create winners and losers. If the city were to grant franchise rights, it could be questioned if some of the service providers could earn enough from the other communities they service to remain in business.

The city could encourage market transparency by publishing service providers rates on the city website. This would lower the cost of a consumer's search for price information. Increased information about pricing often leads to lower prices (Schultz, 2005).

The most likely option for the city is to leave things alone. Allowing residents to select their own service provider gives the resident the chance to select the provider whose service fits best with their needs. Maintaining the status quo also lets the city avoid the possibility of ending a company's business. It could be questioned if a company with two trucks could get access to the financial capital to expand to service the whole city if they were a successful bidder for a city contract. Depending on the length of such a contract term, lenders may hesitate to offer funding for a capital outlay requiring years to pay back if the term of a service contract was only a year. If the city council were to advocate for a change to a different method of trash collection, they would likely be seen as anti-business.

There are issues that are not addressed when analyzing the organization of trash collection in Manhattan. Although some might argue that the free market will sort out the best price for consumers without the interference of the city, there should be analysis of other costs. Would streets require less maintenance if six fewer garbage trucks drove over them each week? Would there be an increase in safety if fewer trucks drove through residential neighborhoods? Would there be an improvement in air quality if fewer miles were driven? Because these costs are not direct or realized quickly, it is not likely to gain the attention of city government.

An option that does not involve city intervention would be for neighborhoods to approach a provider and inquire about lower rates if they reach a certain number of customers in a given area. This would be more likely in areas governed by homeowner's associations.

The fourth and final question posed was, "Is there a significant difference in pricing among service providers?" Tables 4-6 and 4-7 and Figure 4-1 describe the pricing difference among service providers. The price difference from the low-cost provider to the high-cost provider in once-a-week service for a year would be about \$107. If a customer values his or her time to call seven service providers annually at more than that amount, it could be argued that there is not a price difference. The choices for fewer pickups offered by some of the firms would allow customers to have lower costs.

There was little variation in the services provided. If a customer chooses to have less frequent pick up, B&L Trash Service and Joe Mallon Trash Service are the only providers who offer alternative scheduling. If a customer want weekly pick up, but the lowest cost, A-1 Trash Service would fit that need. If combined trash and recycling services are desired, A-1 Trash Service and Howie's Trash Service are the only providers who have both services. A customer needing a large trash container provided could choose A-1 Trash Service, George Mallon Trash Service, Howie's Trash Service, or Waste Management who all provide 96-gallon trash containers. If information about service providers was more readily available, consumers could compare these factors to aid in their service provider selection.

Generalizability

The structure of this study applies to communities with multiple municipal trash collectors. Although pricing information from Manhattan would not hold to other communities, the method of gathering data and comparing prices would work in similar communities. A

municipal study with this format would work well as part of a municipal analysis of direct and indirect costs to the city and consumers. Community members could use the method put forward in this paper to generate information to campaign for a change in municipal services.

This study provides a discussion of transaction costs and questions the role of municipal government in those costs. In this way, it asks whom the city should best serve, community members by disclosing less than transparent prices, or businesses by leaving a structure that works in their benefit alone. The study could also be used as a starting point for a discussion about a city's role in essential services that are provided by private firms. Does the city government have a responsibility to citizens to lower the cost of a service or lessen truck traffic in residential areas?

Limitations and Opportunities for Future Study

When reviewing answers to survey questions asked of service providers, further questions developed. When asked frequency of pickup, B&L Trash Service answered that it was up to the customer. How are those requested pickup signals sent and received?

When asked if the customer could have more than one container, there was not a question if there was a charge for additional containers. This would not factor into this study, as comparisons were made as much as possible to similar service; in this case, one container per week, but without this information, clear cost information is not available.

When asked if the business had a website, the actual address was not requested. Although B&L Trash Service indicated they had a website, it was unable to be verified. Both Waste Management's and Howie's Trash Service's websites were confirmed.

Service providers were not asked if they were accepting new customers. This could create a situation that A1 Trash Service is the low-cost provider, but is not accepting new customers, driving consumers to the next lowest priced provider. Since there is a range of provider costs and they are not clumped at a price point slightly higher than A1, it is suspected that this is not the case.

Although survey questions were worded to represent things a new customer might ask, that leaves some information lacking. To truly have a grasp of the size of each firm and its role in Manhattan, service providers should have been asked how many customers they serviced in Manhattan.

Because customers were not surveyed for this project, there is much information about customer knowledge that was found in literature, but not confirmed. Questions of consumers that would add to this work include, what they think other providers prices are, or where they think their provider falls in the price range; how did the consumer pick the provider they currently use; and would the consumer be open to intervention in their trash pickup if they received benefits such as lower price or less traffic in their neighborhood?

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Appendix A

Table A-1. Municipal trash collectors licensed in Manhattan, Kansas

Service Provider	Telephone Number
A-1 Trash Service	785-587-0229
Arrowhead Trash Service	785-537-2228
B&L Trash Service	785-539-8698
George Mallon Trash Service	785-456-8640
Howie's Trash Service	785-776-8352
Joe Mallon Trash Service	785-494-2385
Waste Management	785-776-7077

Table A-2. Questions for Manhattan municipal trash collectors

(1) How many times per week do you provide residential service?		_____
		times per week
(2) Is there an option to how many times a week you pick up residential trash?		<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(2a)	If so, what are the options?	_____
		times per week
(3) Do you provide a container?		<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(3a)	If so, how large is the container?	
(3b)	Do you charge for the container?	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i> \$
(3c)	Is there a replacement fee for a damaged or lost container?	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i> \$
(4) Can you have more than one container		<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(4a)	If so, who provides the additional container	
(5) Do you pick up items that do not fit in a container?		<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>

(5a)	If so, is there an extra charge	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i> \$
(6)	What do you charge for trash collection service?	\$
(6a)	What forms of payment do you accept?	
(7)	How often is it billed?	
(8)	Do you sign a contract for service?	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(8a)	If so, how long is the contract term?	
(9)	Do you offer recycling services?	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(9a)	If so, what services?	
(9b)	If so, what do you charge for those services?	\$
(10)	How will you let me know about schedule changes for holidays?	
(11)	Do you have a website?	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(11a)	Do you list your prices on the website?	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(12)	Where does the container need to be to be picked up?	
(13)	Where do you advertise your service?	
(14)	How many trucks do you operate in Manhattan?	
(15)	What other communities do you service?	

Table A-3. Questions for Manhattan city official

(1) How many licensed providers are there in Manhattan?	
(2) Is there a charge for the license?	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(2a) What is the cost?	
(3) How long is the license good for?	
(4) What are the requirements for obtaining a license to collect trash in Manhattan?	
(5) Does the city oversee the service providers?	<input type="checkbox"/> <i>yes</i> <input type="checkbox"/> <i>no</i>
(5a) If so, what manner of oversight?	
(6) Does the city regulate pricing of municipal trash collection?	
(7) Has the city ever not renewed a service provider's license?	