<u>Final Report Economic Component – Connecticut PBRN</u>: January, 2015

Project Title: Cost effectiveness, efficiency and equity of inspection services throughout Connecticut's local public health system
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Component 1 Part 1

<u>PROJECT AIMS</u>:

1. What are the scope and costs of four environmental health services *(food protection, private water wells, subsurface sewage disposal and lead poisoning prevention and control)*provided in Connecticut?
2. What are the differences in associated costs incurred by local health jurisdictions (LHJ) that may arise from differences in the size and structure of LHJ?
3. What are the unit and incremental costs of providing four mandated environmental health services for LHJs serving small vs. larger populations, departments vs. districts, and unionized vs. non-union jurisdictions?
4. What is the impact of LHJ size and organizational structure on the unit costs of providing four environmental health services mandated by state law, public health codes, regulations and local ordinances?

Rationale

While all local health departments (LHDs) provide state-mandated environmental services, there has been little research related to the influence of organization structure and size on the cost of such services. The diversity of and variation in organizational structure of local health in Connecticut makes the state an ideal "petri-dish" for evaluating the role of these variations on effectiveness, efficiencies and equity of services throughout the state.

Previous research has shown that variations in public health systems performance can be a function of funding and staffing levels (Gordon, Gerzoff and Richards. 1997; Kennedy and Moore, 2001) but can also be influenced by the population served by the public health entity (Mays, Halverson and Baker, 2004; Turnock, Handler and Miller, 1998). Previous studies have also estimated that up to a point, public health systems are more cost-efficient if they serve larger populations (Santerre, 2009). Preliminary work has been done to look at whether consolidation of services into centralized departments is more or less efficient (Mukherjee, Santerre and Zhang, 2010), but more research is needed in this area. LHDs in CT vary in jurisdictional type, funding levels, staffing and serve a range of population sizes, which allows the CT PBRN a unique opportunity to further this research.

The decision to focus on environmental health services as the area of analysis reflects the reality of CT's local public health system. Connecticut is a state with a population of 3.5 million with 169 towns. There is no county system in Connecticut, and only 9 municipalities with populations ≥ 100,000. The 169 towns are served by 74 local health departments or regional health districts. The 21 local health districts serve anywhere from 2-20 towns. The remainder of state residents is served by municipal departments which can be either part-time or full-time. While part-time municipal departments are decreasing there are still 24 towns that do not have a full-time Director of Health and their health departments may be served by a single sanitarian. These communities account for only 6% of the Connecticut population.

Table 1

Full-Time and Part-Time Local Health Departments in Connecticut

	#Towns	*Population	Percent	Population Range
Full-Time	**145**	**3,374,354**	**94%**	
Municipal	29	1,657,005	46%	18,239 - 145,638
Districts (21)	116	1,717,349	48%	28,194 – 166,117
Part Time	**24**	**203,491**	**6%**	1,917 – 25,729
				100%
Total	**169**	**3,577,845**		

Table 2

Local Health Departments in Connecticut by Population

	<10,000	10-49,999*	50-74,999	≥75,000<100,000	>100,000**
Part Time	**18**	**6**	**0**	**0**	**0**
Full Time	**0**	**12**	**10**	**3**	**4**
District	**0**	**4**	**6**	**6**	**5**
Total	**18 (24%)**	**22 (30%)**	**16 (22%)**	**9 (12%)**	**9 (12%)**

* Only 3 PT LHDs >15,000

In Connecticut, local health jurisdictions may be full-time municipal health departments, part-time municipal health departments and mutli-town health districts. Municipal health departments are part of the local town government infrastructure and function as a department. Any town with a population ≥ 40,000 must have a full-time municipal health department, i.e. employ a full-time Director of Health. Full-time municipal departments with a population ≥ 50,000 are eligible for a state appropriation of $1.18 per capita.

Part-time municipal departments must provide the equivalent of at least one FTE employees and are administered by a part-time Director of Health. They receive no payments from the state. While some part-time health departments have at least one full-time sanitarian on site, others provide minimal regulatory services and utilize contracted employees to provide them. Their focus is primarily on food protection inspections.

Health Districts are full-time health jurisdictions formed by multiple municipalities and governed by a Board of Health composed of representatives appointed by the member municipalities. It operates as an independent entity of government. Districts with a population of ≥ 50,000 or serving three or more towns, regardless of population, are eligible for a state appropriation of $1.85 per capita.

The four services selected for evaluation under this project are recognized as essential responsibilities and services of governmental public health authorities by the public and by local and state lawmakers. These four services were also selected because LHDs must report annually to the State DPH on these indicated programs.

Objectives

The proposed project has two components. Component 1 aims to describe and analyze the scope and cost of four environmental health services provided in Connecticut and the differences in associated costs incurred by local health jurisdictions that may arise from differences in the size and structure of local health departments. These services include: food protection, private water wells, subsurface sewage disposal and lead poisoning prevention and control. Component 2 will evaluate the impact of size and organizational structure relative to a number of hypotheses about the efficiency, effectiveness and equity of food protection services. The primary objectives of the study are to address the following questions:

1. What are the unit and incremental costs of providing four mandated environmental health services for local health departments serving small vs. larger populations, departments vs. districts, and unionized vs. non-union jurisdictions? (Component 1)
2. What is the impact of local health department size and organizational structure on the unit costs of providing four environmental health services mandated by state law, public health codes, regulations and local ordinances? (Component 1)
3. Does increased population size of local health jurisdiction or organizational structure correlate with increased effectiveness and efficiency of food service programs and result in reduced per capita cost for these services? (Component 1)
4. What are the goals of the food protection program and how are these achieved by the various departments/districts? (Component 2)
5. What is the impact of fees on the profitability of food service inspections in the local health districts, and is that fee structure an issue of equity for local food service establishments. (Component 1 & 2)
6. What is the impact of routine local food inspections on establishments and their food service workers? Are inspections correlated with changes in food handling practices and the retention of these changes? (Component 2)

All four services are required environmental services for local health jurisdictions. However, whether or not a LHD will actually provide inspections and permits for private wells and residential septic systems is a function of place. All urban and most suburban areas have public water and are sewered. So the need to have staff certified to perfom such services is determined by the new homes being built that require well and septic or repairs of existing wells or septic systems.

Childhood lead poisoning is a rare condition in Connecticut. Whether or not an individual local health jurisdiction will need to respond to an elevated blood level is a function of geography and aging housing. CT DPH produces lead surveillance reports on an annual basis. In 2012 a blood lead level of ≥20µg/dL was the required level for a full environmental and epidemiologic investigation. A total of 73,785 children ≤6 of age were tested and 522 were ≥10µg/dL (0.7%). Of these tests, only 107 were ≥20µg/dL(0.15%) , triggering a full scale lead response. Only 41 of 169 towns (24%) had at least one case of lead poisoning during the year, and only six reported 31-36 blood levels of ≥15µg/dL. Thirty LHDs reported no lead inspections.

Among CT LHDs, 45% reported having HUD, CDBG or LAMPP funding to support the lead program in their jurisdictions.

For purposes of this study we used the number of lead inspections done as the output variable. Lead surveillance data was also used in the analysis with any blood level ≥10µg/dL being considered positive.

Septic and private well water services may represent a significant amount of sanitarian time in many LHDs, Only three (4.2%) jurisdictions reported no subsurface activities in 2012 and all but six (8.5%) reported some level of well permitting. These were primarily the large urban areas with public water and sewers.

While the first component studies the costs of a number of environmental inspection services, the second component (and efficiency analysis for the cost component) will specifically focus on food protection inspections in CT LHDs. Food protection is being selected because it is by far the largest component of the environmental workload by sheer number of facilities covered and the time associated with inspections. In addition, it is the one service that must be provided by all LHDs whether they are full-time or part-time. Despite acknowledgment that food protection service is an essential service, there is little standardization of local health practice. The delivery, effectiveness, efficiency and equity of these services may be quite different from one LHD to another. Is there a "standard" food inspection, or do they vary among jurisdictions? Which LHDs offer education for food workers as part of their services and which do not? Are training classes required and held regularly for food service establishments within the jurisdiction in which they do business? Are local fees utilized to offset the costs of providing such services? Does the local health jurisdiction qualify for the state per capita subsidy? Do licensing fees cover the actual cost of the required food inspections? These questions among others can lead to broader understanding about whether the size and organizational structure of LHDs can influence the effectiveness and equity of these services. These issues will be evaluated using key informant interviews and a project steering committee.

Routine food service inspections are a cornerstone of most food prevention programs, but their efficacy in changing food service practices and management attitudes toward compliance have not been demonstrated (Jones, Pavlin and LaFleur, 2004; Campbell, Gardner and Dwyer, 1998; Jenkins-McLean, Skilton and Sellers, 2004; Reske, Jenkins and Fernandez, 2007). Are such inspections merely endured as a requirement to maintain local licensure or does real and enduring change occur as a result of this regulation? This question will be probed using qualitative focus groups with food establishment QFOs and managers.

Research Design

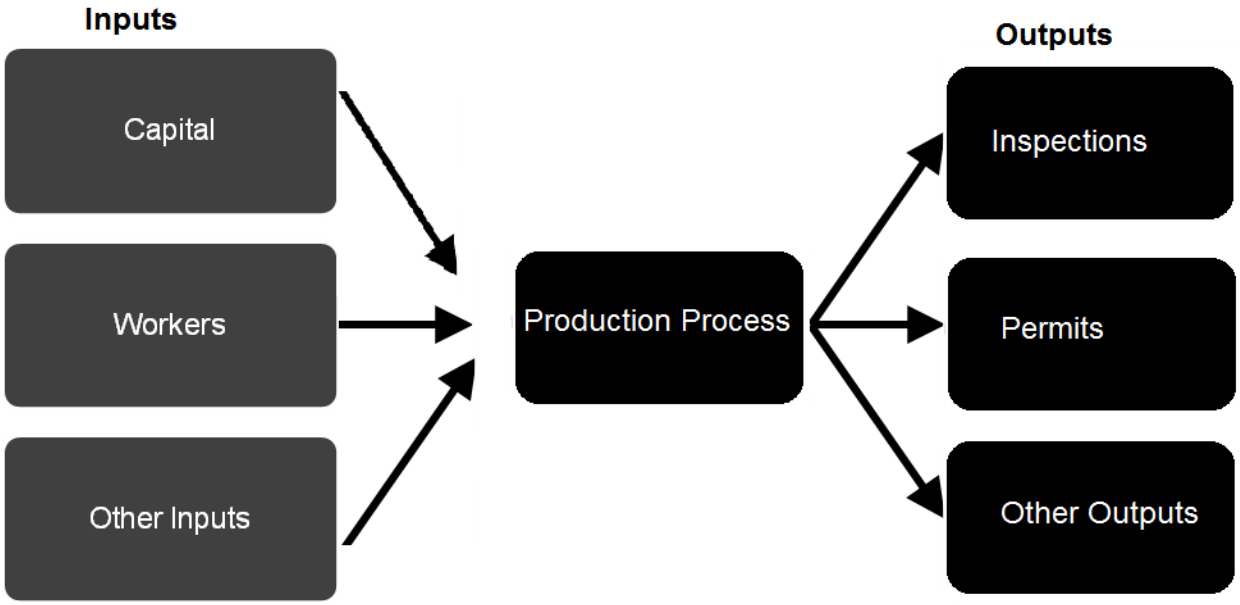
This research project uses a quantitative approach to estimate the cost of providing the various types of public health inspection services. Cross-section and longitudinal data are collected for the yearly cost of providing inspection services, average wage cost of personnel, number of inspections, number of establishments, mix of inspection sites, and characteristics of the various local health departments. Additional information was to be collected on whether local health departments produce internally or contract out for inspection services and the degree to which operating funds come from internal or external sources. These survey questions were added to the online survey which is described below in Component 2. Multiple regression analysis was be used to estimate cost functions, whereas a survey of public health directors was used to measure the fixed costs of the four types of inspection services.

Background: Cost Functions for Healthcare and Public Health

Cost functions estimate the costs associated with the “production function”. A production function is based on the production process where a number of “inputs: are combined together, and using technology through the production process, are transformed into “outputs”. The production process for environmental health inspections is illustrated in Figure 1 below.

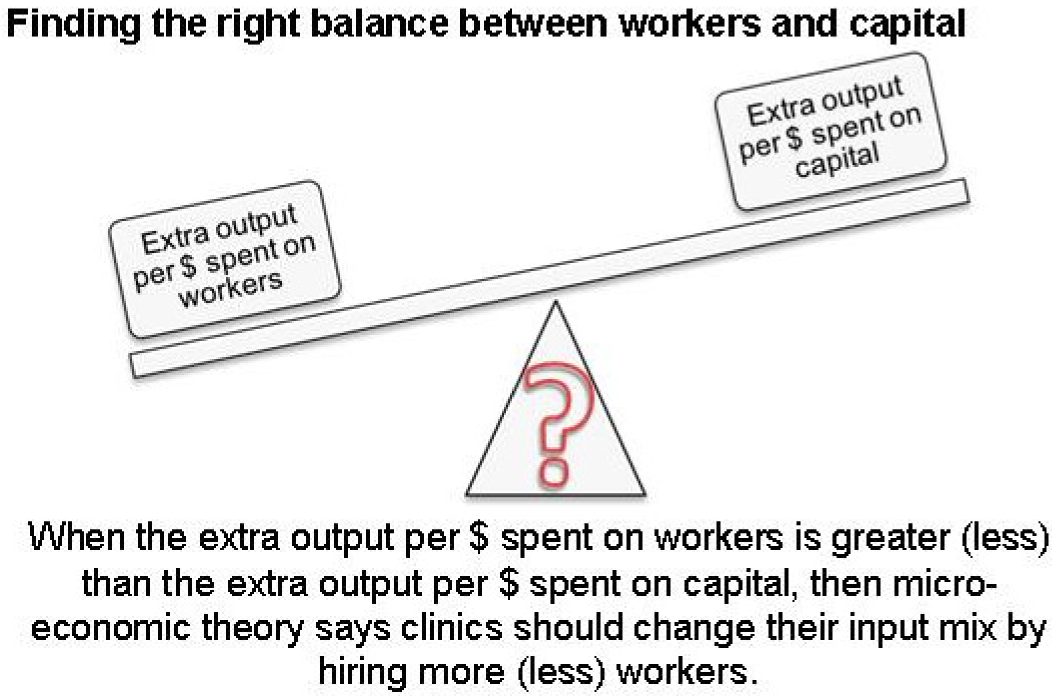
Figure 1

Production of Environmental Health Inspections



In choosing the combination of various inputs to use in their production process, we assume that local health jurisdictions compare the extra incremental benefits to be obtained from hiring another worker against the incremental benefits from renting or purchasing more physical capital (equipment, machines, real estate, etc.). If the extra “output” per dollar spent on workers is greater than (less than) the extra “output” per dollar spent on capital, the jurisdiction would choose to hire more (less) workers and less (more) capital. This balancing act is illustrated in Figure 2. The jurisdiction will have hired the “right” amount of both inputs when the extra output per dollar spent on each input is equal for both inputs. The cost function that we estimate for local public health services embodies this balancing process, and for this reason it is an ideal tool for estimating economies of scale and scope since it assumes jurisdictions are doing their best in choosing inputs to balance the benefits of using all inputs.

Figure 2



Cost Function Studies - Background

Cost Function Analysis is a technique from the Industrial Organization literature in economics, which has been applied to many different industry studies (such as hospitals; and the manufacturing sectors) to aid in decisions of how many firms, how much of each input each firm should use, and what size firms to have in an industry. Cost Function Analysis can help with decisions of whether it is more efficient for many small firms to produce small amounts, or fewer large firms to produce large amounts, of a product or service in an industry. Cost Function Analysis has also been widely used to understand if it is less costly for production of two or more distinct products or services to each occurring separately in different firms, or together in one firm. Underlying cost functions is the production process, where "inputs" are converted into "outputs" (as shown in Figure 1). A crucial point about cost functions is that they help determine how much of a product firms should make, and how the firms should produce the products, in order to operate "efficiently" (that is, to minimize the average costs of producing the product). When local public health jurisdictions are not using the right input mix (see Figure 2), resources are wasted and some people (residents and businesses) may not get the services they need. While it may seem to be a trivial problem to solve, it is complex since there are many other variables affecting a jurisdiction's decision of how to produce its output(s). It is necessary to control for these other factors with regression analysis when estimating costs with a cost function.

Cost functions have been estimated for a variety of different sectors and industries, including transportation, manufacturing, and health care, among others. Early studies in the general literature on hospital cost estimation, for instance, simply regressed costs on a list of variables (*ad hoc* or behavioral cost functions, such as Lave and Lave, 1970, Evans, 1971, and Lee and Wallace, 1973), without considering the conditions the function needs to satisfy to be a relevant representation of cost minimization. In later empirical work, regularity conditions for the cost function in terms of output(s) were accommodated, but not relationships with input prices (such as Granneman, Brown and Pauly, 1986, and Vitaliano, 1987). Recognition of such input price relationships is necessary, however, for appropriate measurement of scale economies and scope economies.

More recently, researchers have been using flexible cost functional forms that allow for the representation of more “factors of production” and interactions underlying actual health costs for empirical analysis of hospital costs. Cowing and Holtman (1983) and Vita (1990), for example, used translog (second order approximation in logarithms) functional forms with multiple outputs, which facilitate the estimation of scope (diversification) economies. Bilodeau, Cremieux and Ouellette (2000) also assumed a translog form, and tested for required regularity conditions to establish whether hospitals are actually minimizing costs. Li and Rosenman (2001) used a generalized Leontief form (second order approximation in square roots), because they found that it was theoretically justified, but the translog function was not, for their data on hospitals in Washington State.

Along with the move toward functional forms more supported by microeconomic foundations, the literature has also increasingly tended to rely on panel (for a group of hospitals over time) rather than cross-sectional (at one time period) data (see, for example, Zwanziger and Melnick, 1988; Gaynor and Anderson, 1995; Bilodeau, Cremieux and Ouellette, 2000). The importance of this was emphasized by Carey (1997) who showed that scale economies may be evident from panel data even if cross sectional data fail to reveal these economies.

In the literature on costs of local public health services, Honeycutt et al (2006) outlines a process for analyzing the costs of public health services. This is a relatively comprehensive guide, including a discussion of the need to identify “outcomes” for cost effectiveness studies. But such cost effectiveness studies are different from the goals of our cost function analysis – that is, to assess the optimal size of local public health jurisdictions. Cost function analysis differs from cost-effectiveness by controlling for other factors that affect costs. Cost Function Analysis is a promising way to help local public health jurisdictions agencies analyze the issues of the scale and scope of services to provide.

Mays (2013) studies scale and scope economies for 20 public health services across 360 communities in 3 different years (1998, 2006, 2012). He estimates a “semi-translog” cost function, where “scale” represents the population size, “scope” represents the availability of the 20 public health services, and “quality” represents “perceived effectiveness of each activity”. The functional form is considered a semi-translog opposed to a translog, since Mays includes linear and quadratic terms for each of “scale”, “scope”, and “quality”, but omits interaction terms. He finds that costs increase as scale rises; costs increase as scope rises; and lower costs as perceived effectiveness increases.

Singh and Bernet (2014) analyze the costs of local public health services in Florida. While they consider economies of scale and scope, their approach is based on an ad-hoc specification, with scale and scope variables similar to Mays (2013), rather than a model grounded in economic theory of the production process where inputs are translated into outputs. Our contribution in this research is several fold: we estimate a cost function for local public health services based on economic theory; we consider separate estimates of economies of scale and scope for several categories of environmental inspections; and we leverage a comprehensive data set that we compiled from various sources covering 74 of the 75 local public health jurisdictions in Connecticut, annually from the period 2005 through 2012. To our knowledge, such an analysis of a rich data set using a rigorous economic framework has not been done.

Research methodology and approach

We estimate a translog cost function of providing various types of public health inspection services (i.e., Food service establishments, public water wells, septic, and lead) using data from various local health departments in Connecticut. The estimation of variable costs will be guided by neoclassical microeconomic cost theory. Neoclassical cost theory posits that production costs can be stated as a function of the various types and amounts of output or "outcomes" produced and input prices conditioned on the state of technology, and other factors, or:

$$TC = f\,(Q_R, Q_W, Q_S, Q_L, w_L, w_K; X, t) \qquad (1)$$

where: TC represents total costs, Q_R represents the food service outcome (number of restaurant inspections), Q_W reflects the water outcome measure (number of well drinking water permits and inspections), Q_S stands for the septic/sewage outcome measure (number of septic/sewage inspections for new homes, failing systems, and B100's), and Q_L captures the lead outcome measure (number of lead inspections). w_L represents the average wage of all workers, and w_K represents the average price of physical capital. X is a vector of variables that stands for any for technology or institutional differences across local health departments in Connecticut (such as type of district), and we also include in X a variable for number of children testing with cumulative blood levels equal to 10 or higher; whether there are any nurses on staff; whether each jurisdiction is a city/town local health department, a district consisting of several towns, or a part-time local health jurisdiction; and whether or not the jurisdiction is considered to be in an urban or rural location of the state. t represents a time trend for the 8 year period of our analysis (2005 through 2012). These variables serve as control variables in the estimation equation.

The specification of these four different outputs allows us to investigate if scale economies hold overall for the 4 classes of inspection services. Scale economies take place when unit costs fall with a greater number of services produced largely due to the specialization of inputs. Joint product terms (e.g., Q_R x Q_S) are specified in the estimation equation to capture the possibility of scope economies. Scope economies occur when the joint costs of producing two or more outputs together is less than the total costs of producing them separately. Scope economies can result from a sharing of common inputs. Specification of the input prices is necessary for a well-behaved cost function and allows for the possibility that local health jurisdictions exhibit substitutability with respect to different inputs used in the production process. A specific form is given to equation (1), specifically, a translog total cost function, and the resulting equation is estimated with multiple regression analysis. The parameters from the estimated model allow us to determine the scale and scope economies estimates for all services for a given volume of inspections and/or district characteristics. We also adjust for the potential impacts of inflation, by deflating the total cost and average wages before performing our cost function estimations.

The following equation (2) is a specific example of equation (1) for a variation of the translog cost function:

$$\mathrm{Log}(TC_{it}) = \alpha_0 + \alpha_1 \log(w_{1t})\log(w_{2t}) + \Sigma_i\, \alpha_{2it}\log(w_{it})2 + \Sigma_i\, \gamma_i Q_{it} + \Sigma_i\, \Sigma_j\, g_{ij} Q_{it} Q_{jt} + \beta X_{it} + \tau T + \phi_{it}\ , \qquad (2)$$

where the α, γ, β, τ represent parameters to be estimated with regression analysis; w_{it} represents the prices of capital and average wages at time t; T represents a time trend; the Q_{it} represent our four "outputs" or "outcomes" (inspections and/or permits for food, water, sewer, and lead); the X is a vector of shift variables, including the variables described above; and ϕ is an error term that satisfies the typical assumptions for least squares regressions.

Economies of Scale

When there is only one output type, economies of scale can be written as:

$$\begin{aligned} \varepsilon &= [\partial TC/\partial Q][Q/TC] \\ &= \partial \log TC / \partial \log Q \\ &= MC/AC, \end{aligned}$$

where log represents the natural logarithm, MC is incremental (or marginal) costs, and AC is unit (or average) costs. It is noteworthy that $MC \equiv [\partial TC/\partial Q] = [\partial VC/\partial Q]$, which is the derivative of the VC function with respect to Q. An estimate for $[\partial \log TC/\partial \log Q]$ is obtained after estimating the variable cost function (1) by regression analysis, plugging in the estimated parameter values, and then differentiating with respect to Q. AC is TC/Q, so an estimate of TC is needed in order to assess the value of ε.

When MC>AC (or $\varepsilon>1$), then AC is rising as Q increases, so the district would be performing too much of its service relative to the "efficient" amount. When MC<AC (or $\varepsilon<1$),, then AC is falling as Q increases, so the district could lower its unit costs by performing additional services (Q). When MC=AC (or $\varepsilon=1$),, this would represent the "minimum efficient scale" and there would be no benefit to either increasing or decreasing the "size" of the district. After estimating a specific functional form of the cost function (1) using regression analysis, it would be possible to perform hypothesis tests on ε, to determine whether ε is statistically significantly less than 1, equal to 1, or greater than 1.

When there are several output types, k, economies of scale can be written as:

$$\begin{aligned} \varepsilon &= \Sigma_k [\partial TC/\partial Q_k][Q_k/TC] \\ &= \Sigma_k [\partial \log TC / \partial \log Q_k] \\ &= \Sigma_k [MC_k/AC_k] \end{aligned}$$

Specifically, in our application, we have 4 outputs, so k={R, W, S, L}. This elasticity equation becomes:

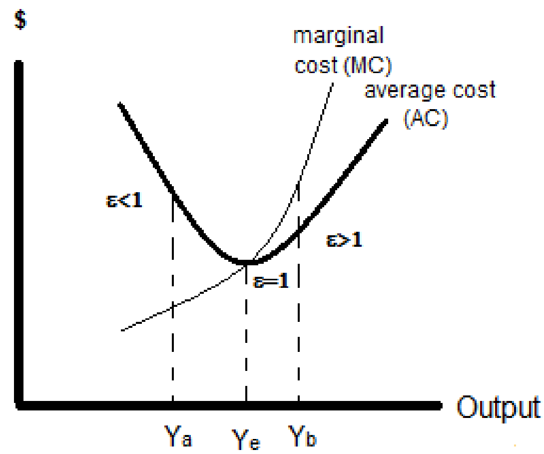
$$\begin{aligned} \varepsilon = {} & \partial TC/\partial Q_R \bullet(Q_R /TC) + \partial TC/\partial Q_W \bullet(Q_W /TC) \\ & + \partial TC/\partial Q_S \bullet(Q_S /TC) + \partial TC/\partial Q_L \bullet(Q_L /TC) \end{aligned}$$

Once we obtain data on TC and the outputs for each k, then estimate equation (2) using nonlinear least squares regression analysis, we "plug in" the resulting parameter estimates to obtain an estimate of ε. In evaluating the estimate of ε, we use the parameter estimates from

(1), together with the mean of the data over all years for each jurisdiction. Figure 3 below illustrates how the estimates of ε translate into economies or diseconomies of scale estimates.

Figure 3

Economies of Scale



ε = MC/AC
At output level Ya , MC<AC, so ε<1 (economies of scale), unit costs fall as a little more output is produced
At output level Yb, MC>AC, so ε>1 (diseconomies of scale), unit costs fall as a little less output is produced
At output level Ye, MC=AC, so ε=1 (efficient scale), unit costs are minimized at this level of output

Economies of Scope

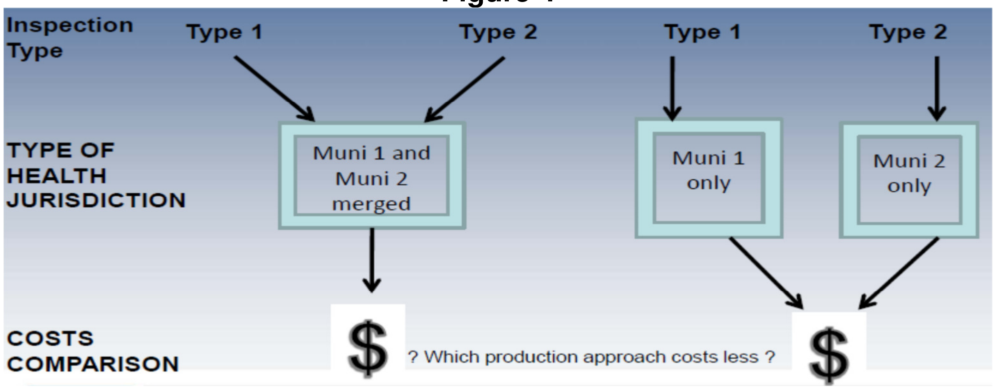
In the presence of at least two outputs or outcomes, incremental (or marginal) costs of output 1 will fall when the quantity of output 2 rises; in other words, it is cost efficient for the local health district to engage in both activities (called "economies of scope"). In other words, $\partial^2 TC/\partial Q_1 \partial Q_2 < 0$ is a sufficient condition for economies of scope. Alternatively, it might be more cost efficient for each of 2 districts to specialize in one of 2 different outputs, in which case $\partial^2 TC/\partial Q_1 \partial Q_2 > 0$ is a sufficient condition for economies of specialization. Once we estimate the TC function in equation (1) or (2), it will be straightforward to calculate the $\partial^2 TC/\partial Q_1 \partial Q_2$, and then perform statistical tests on whether or not it is greater than or less than zero, in order to test whether there is economies of scope or specialization in the individual districts. This concept is illustrated in Figure 4. More formally, a sufficient condition for economies of scope is:

$$\partial[\partial \log TC/\partial \log Q_1]/\partial Q_2 \bullet [TC/Q_1] = \partial^2 TC/\partial Q_1 \partial Q_2 \bullet [TC/Q_1] = [\partial MC_1/\partial Q_2] \bullet [TC/Q_1] < 0$$

This implies that the Marginal Cost curve for one output drops when more of the other output is produced (in other words, it is weak complementarity, as in Vita, 1990). In this instance, it would be more cost efficient for each district to produce both outputs 1 and 2, since producing more of one reduces the incremental cost of producing the other.

Conversely, there could be economies of specialization if $\partial^2 TC/\partial Q_1 \partial Q_2 < 0$. In this instance, the Marginal Cost curve for one output rises when more of the other output is produced, so it is more cost efficient to produce these two outputs separately. In our application, this would imply that districts should specialize. In other words, one district should provide output 1 for itself and for at least one other district, and the other district should produce output 2 for itself and at least for the first district as well.

Figure 4



We have annual data for each of 74 of the 75 local health districts in Connecticut, covering 8 years. We omit the elasticity estimates for one municipality because it merged in the middle of our sample period, For each district we use the average of all years' data to generate economies of scale and economies of scope estimates. There are several approaches to performing hypothesis testing, one of which is to use the Delta Method[12] in order to obtain standard errors which can be used to construct t-statistics. This approach uses the nonlinear least squares parameter estimates to evaluate the elasticity for each district at the mean of all data point observations for each district.

Results and Data

During this project, progress was made on both areas of the proposed work; in establishing the methodology analyzing the scope and costs associated with the identified inspection services and in studying the characteristics of local health departments that were most significantly associated with these activities. Specifically the outputs for inclusion were:

- Private water wells = the total number of private and public water well permits issued
- Food Services = the total number of food establishments (Classes I-IV) and temporary events
- Septic Services = the total number of new permits, repair permits, lots tested and B-100 application reviews
- Lead = total number of childhood lead investigations

During the first half of the project period, there was an emphasis on collecting the most recent available data for use in the project. This included data from the 2005-2012 LHD Annual Report from the Connecticut Department of Public Health. Unfortunately , while the revenue data was relatively available, expenditure data from municipal departments were neither required nor consistently collected during the study period. This resulted in considerable missing data from municipalities. Substantial effort was expended to obtain expenditure data for all 53 municipal LHDs. In some cases financial information was available on-line on the town websites. The remaining expenditure data was collected directly from the local health director and/or the finance director. Again, the level and detail of the data was limited and in the final analysis, only total annual expenditure data was obtainable. As a result we were limited in our ability to separate the cost of only environmental health services from those of the entire LHD. While the outputs represent only EHS efforts, the cost reflect the entire operation. Work was then undertaken to clean the data.

This approach of analyzing a DPH data set obtained from official reports is in contrast to that of some of the other ongoing cost studies that engage in primary data collection through survey instruments.

Specifically, a longitudinal data set from 2005-2012 for nearly all of the 74 Connecticut local health districts and local health departments has been put together by collecting information from publicly available financial reports from these towns, and merged with publicly available data from the State of Connecticut Department of Public Health. This data was combined with additional data from the publicly available State of Connecticut's childhood blood lead surveillance reports, to provide a rich data set for the purpose of estimating cost functions and economies of scale for the local health organizations. Our findings are that on average, Connecticut's local health districts and departments are too small; in other words, their elasticity of scale is less than 1.0. When separating these into the various types of local health organizations, we find that the part-time districts are most inefficient, with an elasticity of scale estimate of closest to 0. This implies these specific part-time departments are performing too few inspections. In other words, efficiency can potentially be improved by merging these part-timers to form larger districts. In contrast, the full-time local health departments and local health districts are more efficient but still not at the minimum efficient scale, since their elasticity of scale on average is greater than the part-timers but still less than 1.0. But the elasticities of scale for the districts are larger on average than for the full time municipal departments, implying the districts are closer to being efficient than the municipal health departments. In other words, both the districts and departments could become more efficient by performing more inspections, but the departments are further away from this goal. A histogram of the 74 elasticities of scale estimates are shown in Figure 5 below.

Data Sets

1. Annual performance and financial reports submitted by LHJs to DPH
2. Lead data: Childhood Lead Surveillance data by blood lead level, by town 2005-2012
3. Total Expenditure data for virtually all 75 CT local health departments and districts from 2005 through 2012, from the local health department or the city finance department.

In addition to the variables discussed a number of other variables were added to the model to control for LHD efforts and services outside of environmental health. Nurses and health educators are the most commonly employed health care workers by LHDs outside of environmental health personnel. For 2012, 45% of LHDs reported employing any nurse and 34% reported employing any Health Educator. The effect of unionization was also considered. Fifty-six percent of LHDs reported having a union. The variability of these factors by LHD type is of interest. Finally, we also controlled for urban/rural designation.

Table 3 Local Health Departments in Connecticut by non-EHS Personnel and Union

	Any Nurse	Any Health Educator	Union
Part Time	1 (4.2%)	0 (0%)	7 (31.8%)
Full Time	21 (72.4%)	13 (44.8%)	26 (89.7%)
Districts	11 (52.4%	12 (57.1%)	7 33.3%

Table 4. Costs, wages, environmental health inspections and rural-urban status by LHD type

Variable	All LHDs	FT Munis	Districts	PT Munis
Total Cost				
Mean	$1,541,909	$3,013,206	$1,173,964	$193,655
Median	$565,453	$846,184	$978,331	$ 44,291
Average Wage				
Mean	$33,341	$41,327	$42,082	$17,585
Median	$36,832	$42,387	$41,537	$ 7,773
H_2O Wells				
Mean	40	20	84	29
Median	15	11	48	12
Lead Insp				
Mean	22	46	11	4
Median	1	2	2	1
All Food				
Mean	434	565	665	111
Median	269	398	562	47
Septic				
Mean	257	161	559	130
Median	140	112	459	82
Rural Urban	.835	.835	.820	.845

The translog total cost function regression results are presented in Table 5. First, Table 5 indicates results for 529 observations, even though there are 600 observations over the time period and across jurisdictions in our analysis. This disparity is due to the fact that there is missing data for total costs for some jurisdictions in some years. Some of these missing values were coded as “0”, so we added the sample condition that the total cost variable needed to be greater than 1 in order to be included in the regression sample.

The final model includes average wage, average capital price, food inspections, water inspections, lead inspections, sewer inspections, rural/urban dummy variable, nurse staff dummy, cumulative lead blood level over 10, and dummies for whether or not the jurisdiction is a full-time municipality or a district. The model is a reasonably good fit, with an R-squared of approximately 0.64. This implies that approximately 64% of the variation in total costs can be explained by our model, which is encouraging given the issues with the quality of our data. We performed a joint test of significance, and we reject the null hypothesis that all variables are jointly insignificant (with a P-value < 0.001). Several of the parameter estimates involving the individual inspections are individually statistically significant at the 5% or 10% levels, although many of the interaction terms are insignificant. This insignificance arises due to multicolinearity, which inflates the standard errors although likely does not bias the parameter estimates, which justifies using them to calculate the elasticity estimates. Many of the other control variables are highly statistically significant, including whether or not any nurses are on staff (positive and significant effect on total costs); whether the municipality is considered urban (negative and significant effect on total costs, implying less money is spent in urban areas); and the number of children tested who have blood levels of at least 10 (positive and significant, implying municipalities with more lead cases have higher total costs). Also, districts and municipal health departments (DISTR2 and DISTR1) spend more money than part-time health jurisdictions.

Table 5 – Least Squares Regression Results of the Translog Total Cost Function

Dependent Variable: LOG(TOT_COST_REAL)
Method: Least Squares

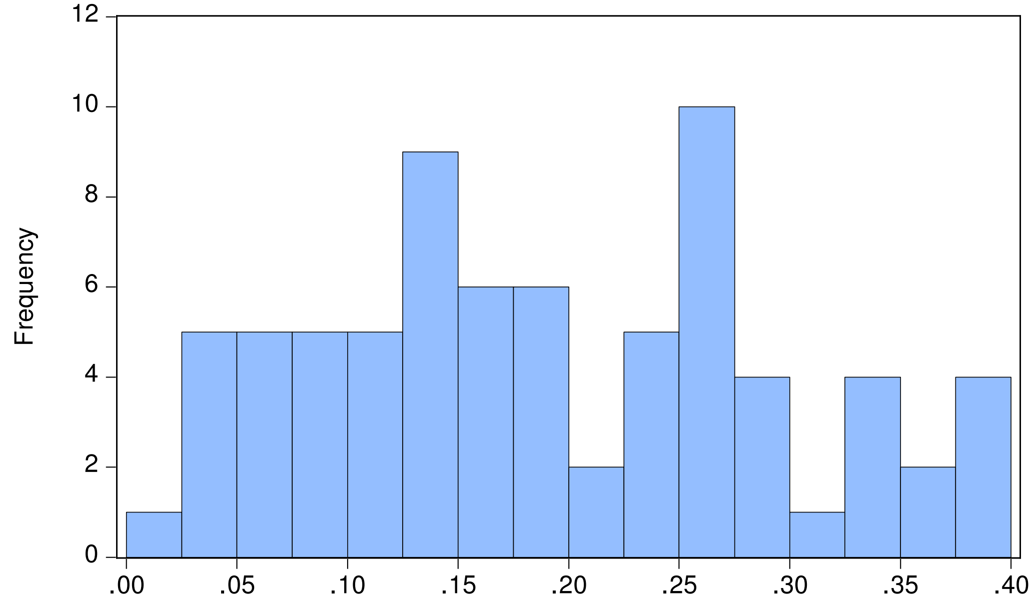
Sample: 1 600 IF TOT_COST_REAL>1
Included observations: 529

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-49.14854	245.2493	-0.200402	0.8412
LOG(WAGE_AVG_REAL)*LOG(PK)	0.065469	0.099661	0.656918	0.5115
(LOG(WATER_PRIV_WELL_PERMITS+WATER_PUB_WELL_PERMITS))^2	0.037483	0.033141	1.131035	0.2586
(LOG(LEAD_INSPECTIONS))^2	0.017763	0.013691	1.297395	0.1951
(LOG(FOOD_INSP_ALL_CLASSES))^2	0.017857	0.007538	2.368999	0.0182
(LOG(SEPTIC_TOTAL))^2	0.037458	0.019643	1.906943	0.0571
LOG(SEPTIC_TOTAL)*LOG(WATER_PRIV_WELL_PERMITS+WATER_PUB_WELL_PERMITS)	-0.062385	0.048972	-1.273891	0.2033
LOG(SEPTIC_TOTAL)*LOG(LEAD_INSPECTIONS)	-0.008518	0.023076	-0.369128	0.7122
LOG(SEPTIC_TOTAL)*LOG(FOOD_INSP_ALL_CLASSES)	-0.023105	0.016119	-1.433339	0.1524
LOG(WATER_PRIV_WELL_PERMITS+WATER_PUB_WELL_PERMITS)*LOG(FOOD_INSP_ALL_CLASSES)	0.007207	0.023373	0.308340	0.7579
LOG(WATER_PRIV_WELL_PERMITS+WATER_PUB_WELL_PERMITS)*LOG(LEAD_INSPECTIONS)	0.048250	0.034017	1.418395	0.1567
LOG(LEAD_INSPECTIONS)*LOG(FOOD_INSP_ALL_CLASSES)	-0.018977	0.013625	-1.392723	0.1643
LOG(WAGE_AVG_REAL)^2	0.004271	0.002291	1.864531	0.0628
ANYNURSESTAFF	0.436747	0.110573	3.949846	0.0001
RURAL_URBAN2000	-0.296876	0.128046	-2.318507	0.0208
YEAR	0.029906	0.122297	0.244539	0.8069
DISTR1	1.568125	0.146703	10.68911	0.0000
DISTR2	1.568641	0.160068	9.799856	0.0000
CUMULATIVESTATS_OVER10	0.013363	0.001965	6.799721	0.0000
LOG(PK)^2	0.624030	8.667056	0.072000	0.9426

R-squared	0.641173	Mean dependent var	13.18227
Adjusted R-squared	0.627779	S.D. dependent var	1.688737
S.E. of regression	1.030297	Akaike info criterion	2.934646
Sum squared resid	540.3100	Schwarz criterion	3.096120
Log likelihood	-756.2139	Hannan-Quinn criter.	2.997855
Durbin-Watson stat	0.788086		

Figure 5a

Elasticity of Scale - Average for Each of 74 Local Health Districts



Based on Averages of Annual Data, 2005-2012
(estimating a translog cost function with regression analysis)

Figure 5b
Elasticity of Scale - Mean of Data - Municipal Health Departments

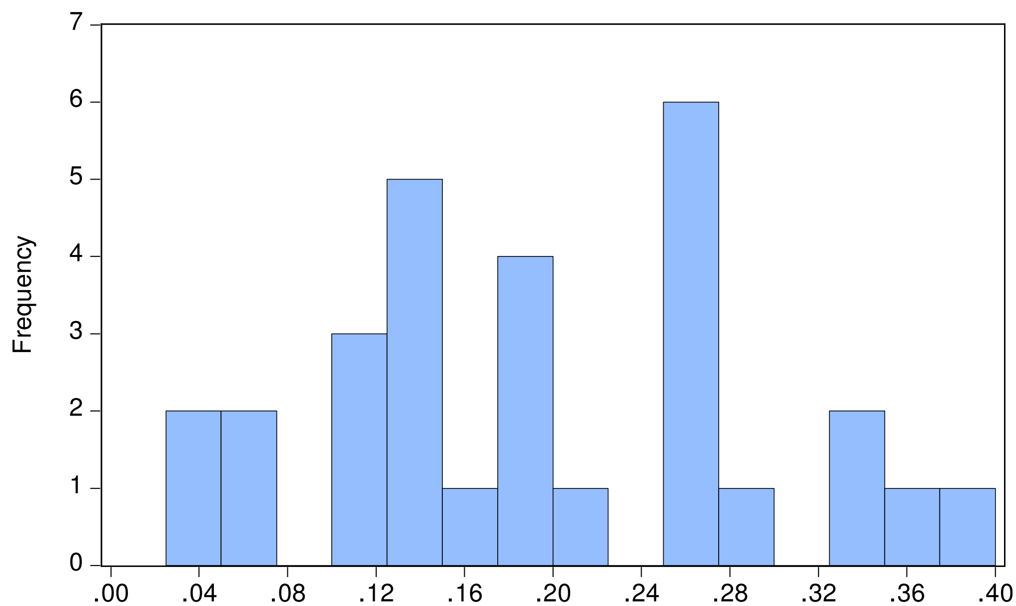


Figure 5c

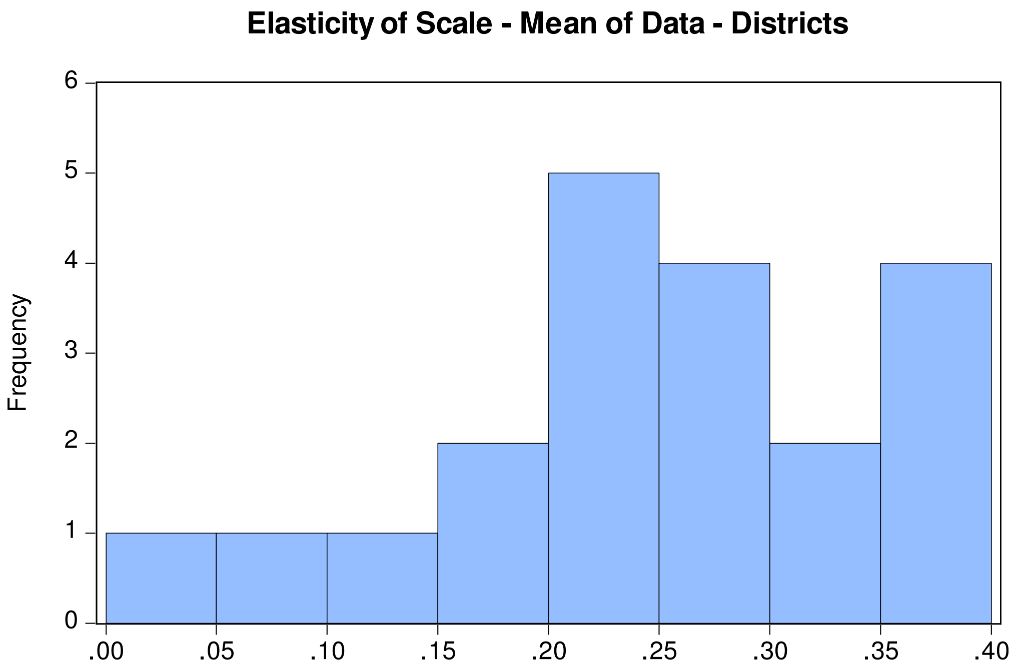


Figure 5d

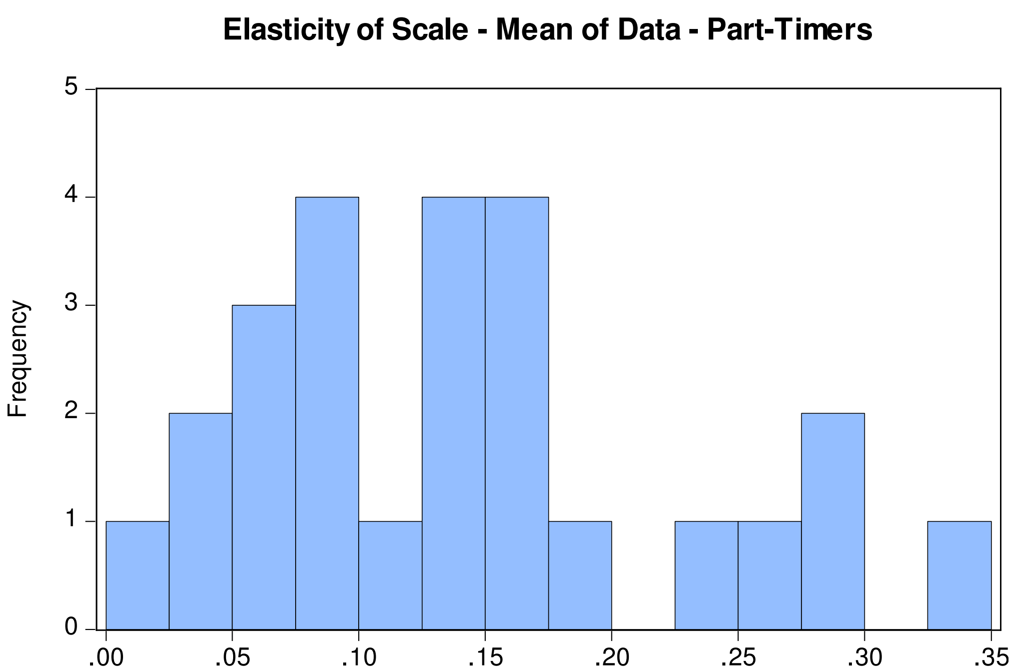


Table 6 reports the descriptive statistics for the economies of scale estimates. The largest value was approximately 0.38, while the lowest was 0.025. The mean of all of the elasticities was approximately 0.19. There are 47 jurisdictions with mean elasticities 0.1 and 0.3.

Table 6 – Descriptive Statistics for the 74 Elasticities of Scale Estimates

Descriptive Statistics for ELAS_OF_SCALE_MEAN_DATA
Categorized by values of ELAS_OF_SCALE_MEAN_DATA
Date: 12/08/14 Time: 23:34
Sample: 1 600 IF ELAS_OF_SCALE_MEAN_DATA>0
Included observations: 74

ELAS_OF_SCALE_MEAN_DATA	Mean	Max	Min.	Sum.	Std. Dev.	Obs.
[0, 0.1)	0.061147	0.093629	0.024645	0.978352	0.022044	16
[0.1, 0.2)	0.149692	0.193027	0.116754	3.891986	0.023473	26
[0.2, 0.3)	0.257651	0.298788	0.202993	5.410676	0.024543	21
[0.3, 0.4)	0.356502	0.388650	0.322746	3.921518	0.024657	11
All	0.191926	0.388650	0.024645	14.20253	0.101217	74

In Figure 5a there are 74 individual jurisdictions and their elasticity of scale estimates. Figures 5b, 5c, and 5d break these out by whether they are municipal (FULL_DISTR_PART=1), district (FULL_DISTR_PART=2), or part-timer (FULL_DISTR_PART=3). There are a couple of notes worth mentioning. First, a jurisdiction classified as part-time may be either a part-time jurisdiction, or a full-time municipality with a part-time Director of Health. Second, Southington (municipality) merged with Plainville (municipality) during the time period covered by our analysis. In addition to some other data availability issues, this led to some data issues that led us to choose to report the elasticity of scale estimate for Southington only.

Figure 5a shows the distribution of the economies of scale estimates for the 74 jurisdictions. For the part-timers, there are 20 jurisdictions that have elasticities less than 0.20, while for the (full-time) districts there are 15 jurisdictions with elasticities greater than 0.20. The municipal health departments have the mode economies of scale estimate, which is 0.26. As described above, many of these municipalities are concentrating on activities in addition to environmental health, which can potentially explain the scattered observations across the low end of the economies of scale distribution.

We explored graphically the relationships between economies of scale estimates and several other variables that are representative of the size of the local health jurisdictions. These size variables include population, full-time equivalents, total cost, and total output (denoted as “total stuff” in Figure 9 below). The size variables are the data from the year 2005, while the elasticity of scale represents the estimates presented above in Figure 5a. There is a positive relationship between economies of scale and each of these size variables, as can be seen in Figures 6, 7, 8, and 9 below.

Figure 6 – Population vs. Economies of Scale

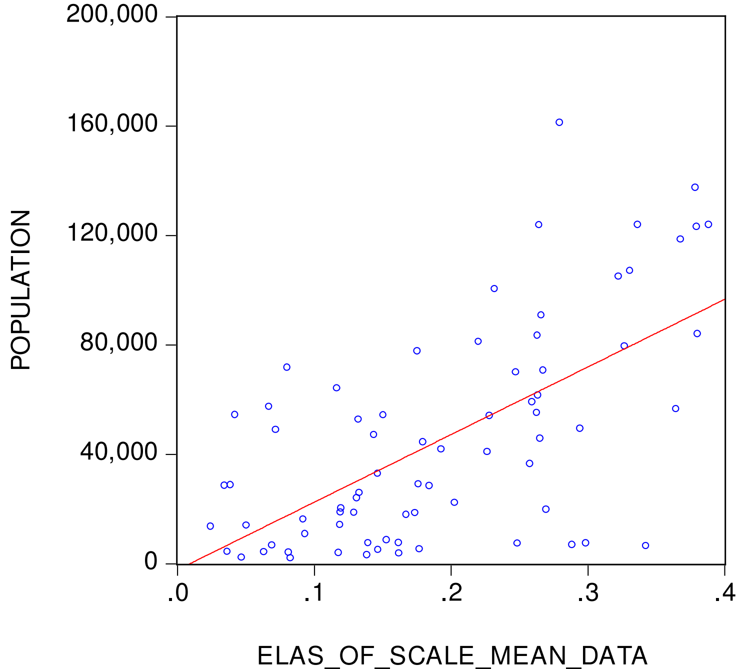


Figure 7 – Full-Time Equivalents vs. economies of scale

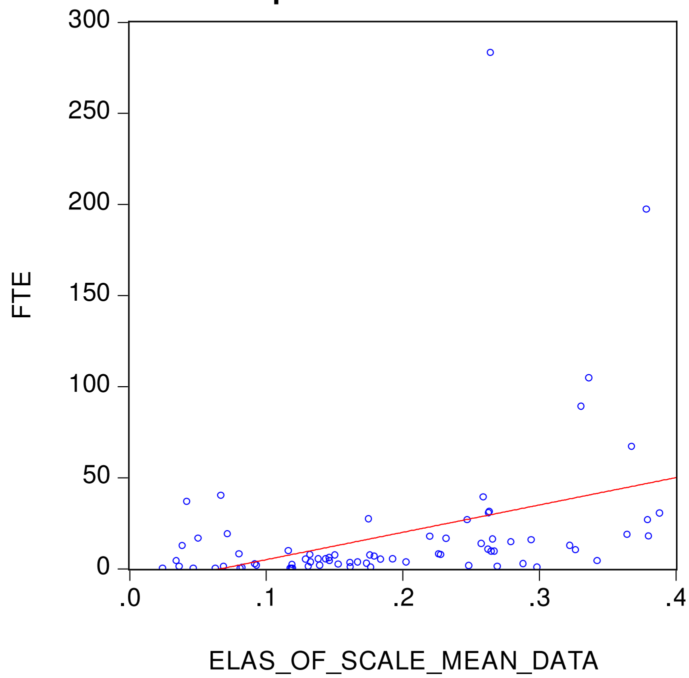


Figure 8 – Total Costs (real) vs. elasticity of scale

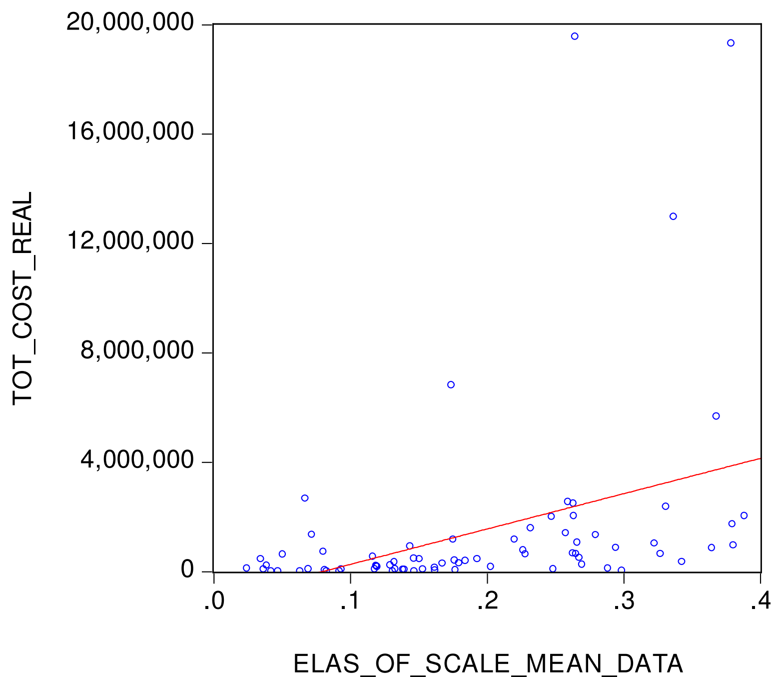
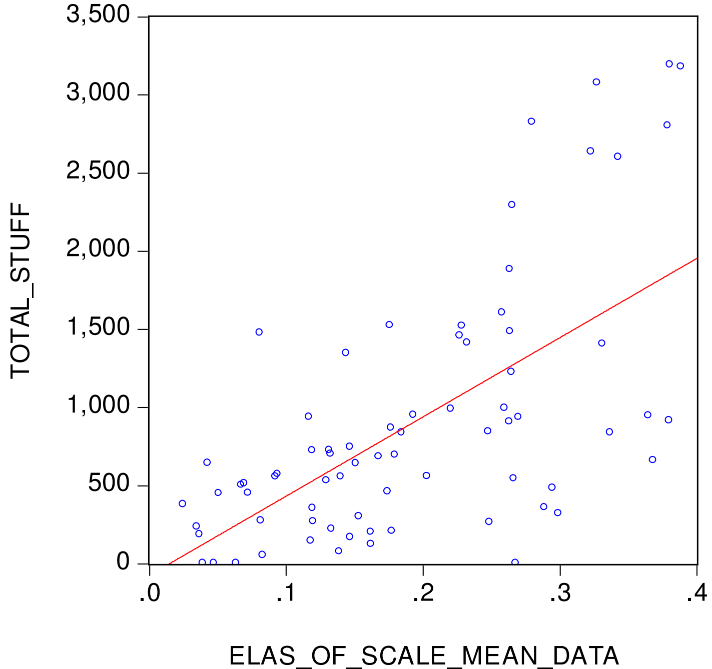


Figure 9 – Total Output for all 4 inspection types vs. elasticity of scale



These positive relationships between economies of scale and each of the size variables imply that “larger” jurisdictions tend to have larger economies of scale estimates. In other words, smaller jurisdictions tend to be less cost efficient than the larger jurisdictions. Interestingly, the “smaller” jurisdictions tend to be part-time jurisdictions, implying there may be the potential for some efficiency gains if these part-timers were to consolidate and/or collaborate and share some or all of their inspection services.

This notion of consolidation and shared services is closely related to, yet distinct, from the notion of economies of specialization and scope. We summarize the results for economies of scope and specialization below. It is noteworthy that this concept of economies of scope/specialization can only be applied to pair-wise comparisons of efficiency of inspection services. So, for instance, it is not possible to address the question of whether or not it is less costly to produce 3 inspection services in the same district or separately.

Economies of Scope/Specialization: Is it less costly to produce two services in same district, or separately?

RESULTS: Based on the results of our econometric analysis, we find that it is:
Less costly to produce water/septic, food/septic, food/lead, lead/septic together
Less costly to produce water/lead, water/food separately

LIMITATIONS

There are a number of limitations of our study. The greatest limitation is the data that we had available to us. While a major contribution is that nobody has used the CT DPH Annual Report data for each jurisdiction over a period of 8 years, there were many holes and concerns that we have over some of the individual observations. Some jurisdictions were missing values of some variables for one or more years, necessitating interpolation in a small number of instances. In other cases, some of the data for some years seemed to be implausible, possibly a result of keystroke errors when the data was entered into the system by the respondent to the initial DPH surveys or some other type of data entry error. Other jurisdictions were simply missing data for some years, which we determined when we contacted them to try and follow up and fill in some of the gaps.

Another potential limitation is with respect to the economies of scale policy implications. Specifically, the interpretation of the economies of scale results is intended to apply to small changes in output. These estimates tell us how efficiency would change when there is a small change in output (number of inspections). If two reasonably large districts or municipalities were to merge, the significantly large jump in the new jurisdiction's output might very well lead to movement too far to the right on the unit cost curve, where unit costs may be too large because of the inefficiencies associated with a large organization. Therefore, the most viable candidates to merge due to economies of scale are the part-time jurisdictions, and possibly for some of the small full-time municipalities as well. These are sufficiently small, and their elasticities are sufficiently small, that a merger leading to higher total numbers of inspections would move the combined jurisdiction lower on the unit cost curve without missing the point of minimum efficient scale.

In terms of economies of scope, our methodology allows for the pairwise comparison of two types of inspections, whereas in reality most jurisdictions perform more than two types of inspections. Therefore, we cannot address the question of whether or not it is less costly for one district to perform all 3 or 4 types of inspections, or if it is more efficient to have 4 different jurisdictions with each specializing and performing only one of these types of inspections.

Finally, many full-time municipal departments and health districts offer many other services besides environmental health inspections, however, for the municipalities, the only cost data we only able to obtain total operating costs. Therefore, since we only control for the 4 environmental health outputs but the costs include all other types of outputs, the elasticities of scale for the municipal health departments may be understated. In other words, $e = MC/AC = MC\ Y/TC$ falls as Y falls and TC rises. Since the Y for municipalities includes fewer activities than are actually undertaken, and the TC includes more costs than merely environmental health, the estimate of e that we obtain is understated. This implies that municipalities are likely to be closer to the minimum efficient scale than we have estimated This is not a limitation for local health departments that focus primarily on environmental health services. For health departments that provide a diverse set of services (such as communicable diseases), the cost per service may be exaggerated. Nevertheless, in some situations, especially in larger districts, it may be difficult to distinguish how much of a particular employee's time is dedicated to environmental health inspections versus other activities, whereas their entire salary may be included in total operating expenses. This is an example of another reason why care should be taken in jumping to policy conclusions from these results, and why there should be a push to acquire and maintain more reliable data on environmental health costs and their components.

Learning Tool

For the purposes of replication, we provide the data set, and the EViews code for the statistical estimation of the cost function, in an appendix. The intention of including this information is to encourage other researchers to utilize cost function analysis for research on the costs of public health services by facilitating their statistical analysis. We also hope this code and data will be useful for instructors who teach students in public health, as a class learning tool for an exercise on cost function estimation.

POLICY IMPLICATIONS

The policy implications of our research are as follows. First, analyses of scale and scope may be a valuable tool to determine efficiency of LHJ services and to evaluate the benefits of merging jurisdictions and/or sharing specific services. As noted in our illustration above, two small jurisdictions may elect to merge to increase economies of scale (e.g. full utilization of EHS staff and reduction of fixed costs) or specialization (e.g. contract with an urban LHD to provide lead services).

Second, issues related to research utilizing existing LHJ financial and service data warrant attention and specifically regarding the advantages and disadvantages of secondary analysis of existing data These include; limitations in working with available LHJ service delivery data that may not be broken down to specific types and/or components; the lack of clear definitions for outputs(i.e., what we count) and whether a standard (i.e., routine) set of activities will be adopted for inclusion in scope and scale analyses. Adoption of the appropriate outputs for analysis is critical. For example, in the case of lead poisoning, it is the elevated BLL that drives the LHJ response to investigate so, the number of investigations is the output of interest.

Third, developing a national standard for categorizing and recording financial data and incentives to adopt the national standard would significantly strengthen research in this area. State and Local Health Departments have an essential role to play in developing and executing a more standardized data system. State Health Departments that provide funding to LHJs could establish standardized report forms that incorporate the categories and types of information that would allow for both local and statewide analysis of economic, financial and outcome data over time. All LHJs would be required to complete them as part of their contractual obligation. State health departments that require such annual reports would need to establish departmental capacity to assure the completeness, validity and analysis of the data, and to provide public access to the information. A National Clearing House could also be established to gather and maintain state and local financial and service data, sponsored by organizations such as RWJ, PHI or a federal agency. National associations, such as NACCHO, ASTHO could play a lead role or become this repository.

Fourth, public health training for administrators in governmental agencies should include more on financial management and application of business models to the management of LHJ finances. Few, if any, have the ability or expertise to determine true unit costs for PH services. This can be addressed through a number of mechanisms. Modular, on-line courses, training through NACCHO, ASTHO, Public Health Training Centers (PHTCs), and other appropriate national organizations, and incorporation into existing Public health school curriculums, are specific suggestions for how this additional education and training might occur.

As a precursor to action on these policy implications it would be important to develop a paper describing why these issues are important for PHSSR research and for the public health enterprise overall. The National Coordinating Center and the PBRNs might collectively work on developing such a paper. There will have to be an incentive for governmental agencies to invest in the creation of an improved data collection and use system. The national public health accreditation and QI initiative is an obvious part of the motivation for enhancements in this area but other drivers and rationale need to be articulated to build the momentum and mechanisms for change in current practices.

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Appendix 1 – Data

Note: For TOT_COST_REAL, WAGE_AVG_REAL, WATER_PRIV_WELL_PERMITS, WATER_PUB_WELL_PERMITS, LEAD_INSPECTIONS, SEPTIC_TOTAL, and CUMULATIVESTATS_OVER10, a value of "1" indicates either a true value of "0" or missing data. These were coded in this way to avoid computational errors, for instance, when the code takes the natural logarithm of a "0" or a missing value.

Note: The jurisdiction corresponding to DISTRICT_NUM=60 merged with another jurisdiction part of the way through our sample, therefore the value for FULLPARTDISTR is "NA" for one of the years.

Obs	DISTRICT_NUM	TOT_COST_REAL	WAGE_AVG_REAL	[illegible]	WATER_PRIV_WELL_PERMITS	WATER_PUB_WELL_PERMITS	LEAD_INSPECTIONS	FOOD_INSTS_ALL_CLASSES	SEPTIC_TOTAL	ANY_NURSE_STAFF	RURAL_URBAN2000	YEAR	[illegible]	[illegible]	CUMULATIVESTATS_OVER10	FULLPARTDISTR
1	1	216492	33555.33	1	25	1	1	269	236	1	1	2005	1	0	1	1
2	1	217708.8	27433.29	1.079948	23	1	1	225	193	1	1	2006	1	0	1	1
3	1	214512.9	25424.29	1.179262	17	1	1	163	218	1	1	2007	1	0	1	1
4	1	222677	1	1.250548	12	1	1	175	141	0	1	2008	1	0	1	1
5	1	474499.1	55833.02	1.279804	50	1	2	218	109	1	1	2009	1	0	1	1
6	1	408916.4	1	1.284916	18	1	1	255	110	1	1	2010	1	0	1	1
7	1	217458.5	43184.61	1.328668	11	1	1	255	112	1	1	2011	1	0	2	1
8	1	1	1	1.380691	11	1	1	141	112	1	1	2012	1	0	5	1
9	2	19301232	46151.53	1	1	1	720	2076	5	1	1	2005	1	0	226	1
10	2	18195082	31638.48	1.079948	1	1	1	1	1	0	1	2006	1	0	192	1
11	2	19406274	59464.65	1.179262	1	1	1051	10	1	1	1	2007	1	0	185	1
12	2	4833319	37356.47	1.250548	1	1	1044	10	254	1	1	2008	1	0	151	1
13	2	3527684	45594.66	1.279804	2	2	1216	692	14	1	1	2009	1	0	111	1
14	2	3461537	40058.69	1.284916	2	2	1216	692	14	1	1	2010	1	0	128	1
15	2	10165661	43896.65	1.328668	2	2	132	692	14	1	1	2011	1	0	152	1
16	2	8184439	39297.31	1.380691	2	2	193	935	5	1	1	2012	1	0	147	1
17	3	1990349	43203.75	1	1	1	2	584	258	1	1	2005	0	1	15	2
18	3	2164924	42684.02	1.079948	68	1	1	523	243	1	1	2006	0	1	9	2

19	3	2693984	43385.36	1.179262	35	1	3	410	240	1	1	2007	0	1	9	2
20	3	2584605	28315.72	1.250548	37	1	11	356	228	1	1	2008	0	1	15	2
21	3	2808778	44386.59	1.279804	40	1	2	331	186	1	1	2009	0	1	8	2
22	3	2727910	44953.87	1.284916	46	1	27	339	217	1	1	2010	0	1	9	2
23	3	2576619	38387.71	1.328668	20	1	2	325	245	1	1	2011	0	1	19	2
24	3	4766743	35683.17	1.380691	35	1	1	280	211	1	1	2012	0	1	4	2
25	4	1	27345.71	1	34	2	1	234	287	0	1	2005	0	0	1	3
26	4	1	27430.91	1.079948	37	10	1	225	305	0	1	2006	0	0	1	3
27	4	108678.8	32142.43	1.179262	13	5	1	240	339	0	1	2007	0	0	1	3
28	4	105508.4	1	1.250548	20	16	1	240	386	0	1	2008	0	0	1	3
29	4	112426.1	36328.94	1.279804	2	2	1	174	191	0	1	2009	0	0	1	3
30	4	112790	33307.23	1.284916	13	2	1	174	186	0	1	2010	0	0	1	3
31	4	114118.1	40094.77	1.328668	12	1	1	174	102	0	1	2011	0	0	1	3
32	4	157327.4	32260.93	1.380691	15	2	1	199	316	0	1	2012	0	0	1	3
33	5	536549	37177.85	1	5	1	1	855	78	0	1	2005	0	1	19	2
34	5	612595.1	37213.45	1.079948	5	1	2	775	49	0	1	2006	0	1	9	2
35	5	847554	34516.27	1.179262	5	1	2	1219	21	0	1	2007	0	1	5	2
36	5	857720.1	40179.15	1.250548	4	1	6	1476	27	0	1	2008	0	1	6	2
37	5	861905.1	50202.02	1.279804	12	1	3	1422	30	0	1	2009	0	1	5	2
38	5	860772.2	41064.96	1.284916	2	1	4	1453	45	0	1	2010	0	1	4	2
39	5	856094.6	50088.92	1.328668	1	1	1	1502	2	0	1	2011	0	1	8	2
40	5	1108143	38554.19	1.380691	1	1	7	1469	61	0	1	2012	0	1	5	2
41	6	636150	40973.77	1	291	10	2	71	1919	0	1	2005	0	1	1	2
42	6	532032.8	45586.35	1.079948	250	7	2	54	1932	0	1	2006	0	1	1	2
43	6	509016.2	40885.31	1.179262	196	5	2	110	994	0	0	2007	0	1	3	2
44	6	568612	46171.07	1.250548	200	10	1	152	1006	0	0	2008	0	1	9	2
45	6	662066.5	53868.6	1.279804	145	4	2	298	841	0	0	2009	0	1	9	2
46	6	746285.4	38653.94	1.284916	147	6	1	373	900	0	0	2010	0	1	3	2
47	6	745866.1	50162.35	1.328668	10	1	1	365	101	0	0	2011	0	1	7	2
48	6	1303678	39379.99	1.380691	130	5	6	194	1100	1	0	2012	0	1	5	2
49	7	627725	38320	1	151	1	1	534	834	1	1	2005	0	1	1	2
50	7	646135.8	42484.88	1.079948	105	1	1	549	903	1	1	2006	0	1	3	2

51	7	651421.3	43274.5	1.179262	76	2	2	426	821	1	1	2007	0	1	3	2
52	7	685633.8	41784.05	1.250548	78	2	1	566	1208	1	1	2008	0	1	2	2
53	7	649519.3	57327.62	1.279804	50	50	3	639	371	1	1	2009	0	1	2	2
54	7	637340.1	38153.34	1.284916	50	50	3	639	371	1	1	2010	0	1	1	2
55	7	638822.4	57148.25	1.328668	53	1	1	633	280	1	1	2011	0	1	1	2
56	7	1354618	1	1.380691	50	50	3	633	244	1	1	2012	0	1	1	2
57	8	78465	4821.667	1	9	1	1	65	71	0	1	2005	0	0	1	3
58	8	29798.58	1	1.079948	18	1	1	88	64	0	1	2006	0	0	1	3
59	8	29384.16	1	1.179262	12	1	1	72	82	0	1	2007	0	0	1	3
60	8	28490.13	5335.359	1.250548	18	1	1	82	58	0	1	2008	0	0	1	3
61	8	28668.67	1	1.279804	1	1	1	1	1	0	1	2009	0	0	1	3
62	8	29189.73	1	1.284916	1	1	1	1	1	0	1	2010	0	0	1	3
63	8	27496.27	8154.788	1.328668	69	1	1	45	203	0	1	2011	0	0	1	3
64	8	25444.79	5071.8	1.380691	3	1	1	69	35	0	1	2012	0	0	1	3
65	9	212081	1	1	1	1	1	1	1	1	1	2005	0	1	5	2
66	9	434995.1	1	1.079948	1	1	1	1	1	0	1	2006	0	1	2	2
67	9	491016	36700.05	1.179262	1	1	1	410	572	0	1	2007	0	1	3	2
68	9	468728.6	31438.46	1.250548	1	1	1	236	841	0	1	2008	0	1	2	2
69	9	444256.2	54404.79	1.279804	14	1	1	267	460	0	1	2009	0	1	2	2
70	9	440128.9	39059.3	1.284916	20	1	1	262	460	0	1	2010	0	1	1	2
71	9	429555.3	52116.53	1.328668	20	1	1	290	160	0	1	2011	0	1	1	2
72	9	875136.4	41709.56	1.380691	1	1	1	199	64	0	1	2012	0	1	1	2
73	10	113076	1	1	1	1	1	330	48	0	1	2005	0	0	1	3
74	10	134112.1	19956.58	1.079948	2	1	1	109	22	1	1	2006	0	0	1	3
75	10	137884.7	7203.86	1.179262	4	1	1	114	41	0	1	2007	0	0	1	3
76	10	136403.4	20308.79	1.250548	6	1	1	114	44	0	1	2008	0	0	1	3
77	10	130336.5	1	1.279804	1	1	1	137	37	1	1	2009	0	0	1	3
78	10	127892.6	9964.231	1.284916	1	1	1	137	56	0	1	2010	0	0	1	3
79	10	131167.1	1	1.328668	1	1	1	1	1	0	1	2011	0	0	3	3
80	10	125453.4	17905.19	1.380691	19	1	1	445	857	1	1	2012	0	0	1	3
81	11	1159667	49724.9	1	33	1	1	950	541	1	1	2005	1	0	6	1
82	11	5981090	45434.63	1.079948	36	1	1	942	418	1	1	2006	1	0	11	1

83	11	4200102	27106.7	1.179262	31	1	2	1299	362	1	1	2007	1	0	10	1
84	11	5672647	26936.18	1.250548	30	1	1	1403	431	1	1	2008	1	0	8	1
85	11	4640707	43462.89	1.279804	19	1	2	458	328	1	1	2009	1	0	14	1
86	11	5522365	22413.46	1.284916	30	1	4	130	282	1	1	2010	1	0	13	1
87	11	5865191	21906.02	1.328668	1	1	10	130	1	1	1	2011	1	0	22	1
88	11	1885153	22582.3	1.380691	19	1	2	652	276	1	1	2012	1	0	6	1
89	12	172149	1	1	7	1	1	88	174	0	1	2005	1	0	1	1
90	12	187579.2	124295.4	1.079948	11	1	1	156	155	0	1	2006	1	0	1	1
91	12	233629.7	25788.16	1.179262	3	1	1	296	143	0	1	2007	1	0	1	1
92	12	267182.8	66981.34	1.250548	16	1	1	1	28	1	1	2008	1	0	2	1
93	12	268503.9	1	1.279804	21	1	2	336	110	1	1	2009	1	0	1	1
94	12	263469.2	33673.97	1.284916	21	1	2	336	110	1	1	2010	1	0	1	1
95	12	1271641	64128.2	1.328668	12	1	3	358	30	1	1	2011	1	0	1	1
96	12	393068.1	33390.38	1.380691	17	1	1	315	119	1	1	2012	1	0	2	1
97	13	84468	40550	1	33	1	2	17	214	0	1	2005	0	0	1	3
98	13	75466.06	41211.15	1.079948	28	1	1	32	227	0	1	2006	0	0	1	3
99	13	78845.3	43075.71	1.179262	20	1	1	29	220	0	1	2007	0	0	1	3
100	13	79983.11	43709.91	1.250548	21	1	1	31	154	0	1	2008	0	0	1	3
101	13	80003.48	54004.44	1.279804	14	2	1	47	125	0	1	2009	0	0	1	3
102	13	79904.04	42523.88	1.284916	9	2	1	33	149	0	1	2010	0	0	1	3
103	13	81235.61	42559.88	1.328668	1	1	94	52	12	0	0	2011	0	0	1	3
104	13	89321.49	43078.3	1.380691	12	1	1	56	127	0	0	2012	0	0	1	3
105	14	1338450	50216.67	1	1	1	3	434	13	1	0	2005	1	0	18	1
106	14	1318108	48203.18	1.079948	2	1	3	242	4	1	0	2006	1	0	20	1
107	14	3257851	16019.7	1.179262	1	1	3	332	4	1	0	2007	1	0	9	1
108	14	3154861	14515.91	1.250548	1	1	2	398	2	1	0	2008	1	0	13	1
109	14	1974240	44105.52	1.279804	1	1	1	398	1	1	1	2009	1	0	8	1
110	14	2976046	20316.54	1.284916	1	1	1	363	3	1	1	2010	1	0	7	1
111	14	2931716	12385.1	1.328668	9	1	3	517	96	1	1	2011	1	0	14	1
112	14	2645443	16119.21	1.380691	1	1	1	515	4	1	1	2012	1	0	8	1
113	15	716644	22101.38	1	30	1	1	982	465	1	1	2005	0	1	5	2
114	15	826724.3	37999.1	1.079948	19	1	1	1024	510	1	1	2006	0	1	1	2

115	15	775192.2	30285.93	1.179262	17	1	1	875	495	1	1	2007	0	1	7	2
116	15	720875.1	41697.98	1.250548	21	1	1	721	323	1	1	2008	0	1	4	2
117	15	828404.4	35579.23	1.279804	10	1	1	935	236	0	1	2009	0	1	3	2
118	15	784441	42345.74	1.284916	9	1	1	804	201	1	1	2010	0	1	1	2
119	15	851370.9	31522.18	1.328668	1	1	1	849	27	1	1	2011	0	1	2	2
120	15	1485434	34019.1	1.380691	5	1	1	849	199	1	1	2012	0	1	2	2
121	16	637888	41960.95	1	257	1	3	492	2326	0	0	2005	0	1	4	2
122	16	607992.4	42263.2	1.079948	354	1	3	330	2163	0	0	2006	0	1	1	2
123	16	762812.9	40180.05	1.179262	273	1	1	385	1718	0	0	2007	0	1	3	2
124	16	789500	52954.49	1.250548	284	1	1	415	1555	0	0	2008	0	1	5	2
125	16	898763.4	42325.8	1.279804	147	1	2	511	1075	0	0	2009	0	1	1	2
126	16	855840.9	53155.69	1.284916	193	1	2	548	1151	0	0	2010	0	1	5	2
127	16	780264.5	41941.37	1.328668	1	1	30	462	6	0	1	2011	0	1	2	2
128	16	1475200	42849.31	1.380691	163	1	2	412	921	0	1	2012	0	1	5	2
129	17	59350	13294.12	1	28	1	1	14	513	0	1	2005	0	0	1	3
130	17	306473.7	16873.86	1.079948	26	1	1	2	310	0	1	2006	0	0	1	3
131	17	314780.3	5687.258	1.179262	19	1	1	6	191	0	1	2007	0	0	1	3
132	17	353668.4	14518.42	1.250548	26	2	1	5	210	0	1	2008	0	0	1	3
133	17	974751.4	12170.81	1.279804	6	1	1	6	173	0	1	2009	0	0	1	3
134	17	453788.5	20290.8	1.284916	6	6	1	31	228	0	1	2010	0	0	1	3
135	17	2900636	8260.831	1.328668	34	1	1	35	127	0	1	2011	0	0	3	3
136	17	445789.6	6391.211	1.380691	8	1	8	35	172	0	1	2012	0	0	1	3
137	18	110221	30136.36	1	15	1	1	146	197	0	1	2005	0	0	1	3
138	18	1	32346.48	1.079948	15	1	1	134	166	0	1	2006	0	0	1	3
139	18	1	34931	1.179262	18	1	1	139	168	0	1	2007	0	0	1	3
140	18	538567.9	31433.56	1.250548	34	1	1	70	175	0	1	2008	0	0	1	3
141	18	609348.3	25103.33	1.279804	1	1	1	1	1	0	1	2009	0	0	1	3
142	18	522933.4	24825.59	1.284916	7	1	1	102	114	0	1	2010	0	0	1	3
143	18	577579.8	36776.65	1.328668	1	1	226	100	1	0	1	2011	0	0	1	3
144	18	935600.8	3336.935	1.380691	7	1	1	102	134	0	1	2012	0	0	1	3
145	19	2666534	47890.92	1	3	1	1	423	75	1	1	2005	1	0	6	1
146	19	2688448	47659.81	1.079948	7	1	1	353	108	1	1	2006	1	0	2	1

147	19	2643260	39165.91	1.179262	3	1	1	271	93	1	1	2007	1	0	3	1
148	19	2753314	50928.11	1.250548	9	1	1	342	146	1	1	2008	1	0	3	1
149	19	2761395	43170.55	1.279804	6	1	1	419	130	1	1	2009	1	0	3	1
150	19	2640584	46748.39	1.284916	9	1	1	438	105	1	1	2010	1	0	2	1
151	19	2745627	43877.36	1.328668	20	1	1	638	136	1	0	2011	1	0	2	1
152	19	2809833	42893.48	1.380691	3	1	2	713	107	1	0	2012	1	0	2	1
153	20	1019244	47008.85	1	218	1	3	1134	1282	0	1	2005	0	1	5	2
154	20	1012906	50377.28	1.079948	185	1	1	1044	1443	0	0	2006	0	1	7	2
155	20	1114710	41792.96	1.179262	175	1	7	983	935	0	0	2007	0	1	5	2
156	20	994714.7	51657.13	1.250548	97	1	15	1076	905	0	0	2008	0	1	1	2
157	20	1015340	38449.3	1.279804	66	1	6	1019	603	0	1	2009	0	1	12	2
158	20	903383.8	57412.47	1.284916	77	1	3	713	610	0	1	2010	0	1	1	2
159	20	960935.9	41537.1	1.328668	12	1	25	705	171	0	1	2011	0	1	1	2
160	20	1426171	43091.04	1.380691	19	1	17	705	729	0	1	2012	0	1	1	2
161	21	1	1	1	10	1	1	24	19	0	1	2005	0	0	1	3
162	21	7143.483	1	1.079948	1	1	1	1	1	0	1	2006	0	0	1	3
163	21	6583.949	1	1.179262	12	1	1	27	23	0	1	2007	0	0	1	3
164	21	6626.401	1	1.250548	13	1	1	40	23	0	1	2008	0	0	1	3
165	21	7252.027	1	1.279804	1	1	1	1	1	0	1	2009	0	0	1	3
166	21	6696.553	1	1.284916	1	1	1	1	1	0	1	2010	0	0	1	3
167	21	7432.112	1	1.328668	1	1	1	1	1	0	1	2011	0	0	1	3
168	21	7640.088	7773.095	1.380691	8	1	1	31	22	0	1	2012	0	0	1	3
169	22	472492	39192.71	1	41	1	1	285	421	1	0	2005	1	0	1	1
170	22	467288.7	41910.16	1.079948	71	1	1	204	479	1	0	2006	1	0	1	1
171	22	454051.7	42944.44	1.179262	39	1	1	281	373	1	0	2007	1	0	1	1
172	22	481821.7	58908.79	1.250548	52	1	1	414	370	1	0	2008	1	0	1	1
173	22	495580	38881.61	1.279804	34	1	1	330	233	1	0	2009	1	0	1	1
174	22	475597.5	59158.38	1.284916	25	1	1	351	260	1	0	2010	1	0	1	1
175	22	479267.1	39985.38	1.328668	18	2	2	397	292	1	1	2011	1	0	1	1
176	22	481138.2	42386.29	1.380691	10	1	1	392	276	1	1	2012	1	0	1	1
177	23	2031948	62918.96	1	36	1	1	870	578	1	1	2005	1	0	3	1
178	23	1932678	63225.73	1.079948	60	1	1	600	704	1	1	2006	1	0	6	1

179	23	1866818	55755.79	1.179262	54	1	2	909	398	1	1	2007	1	0	1	1
180	23	2042250	67995.09	1.250548	51	1	1	830	405	1	1	2008	1	0	3	1
181	23	1927491	54314.32	1.279804	44	1	5	814	226	1	1	2009	1	0	4	1
182	23	1	60690.69	1.284916	27	1	4	832	221	1	1	2010	1	0	2	1
183	23	1893079	59271.4	1.328668	108	1	29	946	379	1	1	2011	1	0	3	1
184	23	26558074	54422.98	1.380691	42	1	1	935	295	1	1	2012	1	0	3	1
185	24	167566	24825.14	1	74	1	2	224	258	0	1	2005	1	0	1	1
186	24	197301.5	24509.19	1.079948	48	1	3	228	309	0	1	2006	1	0	3	1
187	24	1	26128.89	1.179262	64	1	4	235	278	0	1	2007	1	0	1	1
188	24	1	83988.88	1.250548	31	1	1	239	208	0	1	2008	1	0	1	1
189	24	1	8338.095	1.279804	39	1	1	237	180	0	1	2009	1	0	1	1
190	24	1	72690.77	1.284916	25	1	1	241	187	0	1	2010	1	0	2	1
191	24	1	26200.31	1.328668	1	2	35	95	14	0	1	2011	1	0	2	1
192	24	177310.3	27637.67	1.380691	21	1	1	251	164	0	1	2012	1	0	1	1
193	25	19547058	1	1	1	1	31	1193	1	1	0	2005	1	0	159	1
194	25	23385220	42932.88	1.079948	1	1	1	1	1	0	0	2006	1	0	105	1
195	25	29151936	47912.99	1.179262	1	1	45	1048	1	1	0	2007	1	0	120	1
196	25	27575888	73203.42	1.250548	1	1	28	1	1	1	0	2008	1	0	116	1
197	25	31742872	37909.29	1.279804	1	1	275	1	1	0	0	2009	1	0	72	1
198	25	28625312	51515.96	1.284916	1	1	69	1744	1	0	0	2010	1	0	55	1
199	25	6242201	34979.31	1.328668	6	1	1	1622	42	1	1	2011	1	0	89	1
200	25	21142860	48858.05	1.380691	1	1	10	1629	1	1	1	2012	1	0	70	1
201	26	344332	1	1	2450	1	5	1	145	1	1	2005	0	0	1	3
202	26	22435.09	1	1.079948	1	1	1	1	1	0	1	2006	0	0	1	3
203	26	40853.47	1	1.179262	26	2	1	1	92	0	1	2007	0	0	1	3
204	26	42315.71	1	1.250548	26	2	1	1	92	0	1	2008	0	0	1	3
205	26	30647.5	11369	1.279804	1	1	1	1	1	0	1	2009	0	0	1	3
206	26	33316.23	1	1.284916	1	1	1	1	1	0	1	2010	0	0	1	3
207	26	36516.39	1	1.328668	1	1	1	1	1	0	1	2011	0	0	1	3
208	26	264970.1	28743.18	1.380691	5	1	1	54	37	0	1	2012	0	0	1	3
209	27	24906	4872.75	1	55	3	1	25	238	0	1	2005	0	0	1	3
210	27	509986.1	1	1.079948	49	1	1	24	145	0	1	2006	0	0	1	3

211	27	559547.5	1	1.179262	47	1	1	28	195	0	1	2007	0	0	1	3
212	27	553645.5	6310.64	1.250548	30	2	1	27	127	0	1	2008	0	0	1	3
213	27	596123.1	3669.59	1.279804	1	1	1	1	1	0	1	2009	0	0	1	3
214	27	679185.7	1	1.284916	1	1	1	1	1	0	1	2010	0	0	1	3
215	27	630428.9	4394.059	1.328668	3	1	134	22	7	0	1	2011	0	0	1	3
216	27	847434	4858.184	1.380691	17	1	1	25	123	0	1	2012	0	0	1	3
217	28	2118423	1	1.279804	41	1	2	1	187	0	1	2009	0	1	3	2
218	28	1579484	44122.14	1	63	1	3	758	589	0	1	2005	0	1	3	2
219	28	2114286	42093.65	1.079948	62	1	5	1126	452	1	1	2006	0	1	6	2
220	28	2690537	47856.19	1.179262	64	1	6	1437	565	0	1	2007	0	1	18	2
221	28	2297267	75268.72	1.250548	89	1	1	1610	1130	0	1	2008	0	1	11	2
222	28	2088620	44723.18	1.284916	65	1	9	1	281	0	1	2010	0	1	14	2
223	28	2006179	83047.72	1.328668	1	1	5	1	1	0	1	2011	0	1	16	2
224	28	3015422	81617.49	1.380691	1	1	1	1	322	0	1	2012	0	1	16	2
225	29	1	1	1	1	1	1	1	1	0	1	2005	0	0	1	3
226	29	1	1	1.079948	1	1	1	1	1	0	1	2006	0	0	1	3
227	29	1	1	1.179262	1	1	1	1	1	0	1	2007	0	0	1	3
228	29	1	1	1.250548	1	1	1	2	1	0	1	2008	0	0	1	3
229	29	1	1	1.279804	1	1	1	1	1	0	1	2009	0	0	1	3
230	29	5667.63	1	1.284916	1	1	1	1	1	0	1	2010	0	0	NA	3
231	29	3878.197	1	1.328668	1	1	1	1	1	0	1	2011	0	0	1	3
232	29	1527858	1	1.380691	1	1	1	1	1	0	1	2012	0	0	1	3
233	30	193777	19361.43	1	16	2	1	137	200	0	1	2005	1	0	1	1
234	30	152068.2	19473.54	1.079948	32	1	1	101	129	0	1	2006	1	0	1	1
235	30	158922.8	59777.34	1.179262	54	1	1	106	170	0	1	2007	1	0	1	1
236	30	152939.6	1	1.250548	21	1	1	159	129	0	1	2008	1	0	1	1
237	30	153447.6	18107.13	1.279804	19	1	1	138	343	0	1	2009	1	0	1	1
238	30	157064.3	17699.19	1.284916	14	1	1	133	310	0	1	2010	1	0	1	1
239	30	1635093	19721.42	1.328668	1	1	1	1	1	0	1	2011	1	0	1	1
240	30	1	19769.14	1.380691	19	1	1	154	315	0	1	2012	1	0	1	1
241	31	654098	42077.51	1	6	1	94	725	83	1	1	2005	1	0	6	1
242	31	4272656	47573.34	1.079948	14	1	21	683	119	1	1	2006	1	0	8	1

243	31	3958331	52718.63	1.179262	10	1	16	854	122	1	1	2007	1	0	6	1
244	31	4815362	55452.85	1.250548	3	1	24	787	89	1	1	2008	1	0	14	1
245	31	4782394	41099.81	1.279804	6	1	11	766	79	1	1	2009	1	0	11	1
246	31	3657494	43219.59	1.284916	10	1	23	736	63	1	1	2010	1	0	8	1
247	31	633007.3	39919.28	1.328668	26	1	1	904	159	1	1	2011	1	0	7	1
248	31	671830.3	42645.32	1.380691	3	1	18	800	69	1	1	2012	1	0	23	1
249	32	2548042	55986.33	1	5	1	59	890	42	1	1	2005	1	0	46	1
250	32	6243249	54926.84	1.079948	1	1	1	791	45	1	1	2006	1	0	43	1
251	32	9727468	54962.89	1.179262	1	1	136	800	20	1	1	2007	1	0	53	1
252	32	2664913	46987.69	1.250548	2	1	95	598	28	1	1	2008	1	0	32	1
253	32	2814079	46843.84	1.279804	1	1	101	976	19	1	1	2009	1	0	26	1
254	32	2556890	50289.36	1.284916	1	1	94	950	13	1	1	2010	1	0	27	1
255	32	2410269	47803.3	1.328668	1	1	6	964	19	1	1	2011	1	0	36	1
256	32	2423577	47742.75	1.380691	4	1	92	786	24	1	1	2012	1	0	38	1
257	33	74509	66830	1	13	1	1	31	142	0	1	2005	0	0	1	3
258	33	1	1	1.079948	14	1	1	47	79	0	1	2006	0	0	1	3
259	33	1	1	1.179262	11	1	1	47	126	0	0	2007	0	0	1	3
260	33	1	57859.61	1.250548	7	1	1	47	62	0	0	2008	0	0	1	3
261	33	69395.62	1	1.279804	1	1	1	1	1	0	0	2009	0	0	1	3
262	33	70966	58243.54	1.284916	1	1	1	1	1	0	0	2010	0	0	1	3
263	33	71319.98	1	1.328668	1	1	1	1	1	0	0	2011	0	0	3	3
264	33	589891.5	1	1.380691	1	1	1	105	21	0	0	2012	0	0	1	3
265	34	924555	49416.67	1	33	1	2	1014	298	0	0	2005	1	0	3	1
266	34	1	51513.94	1.079948	29	1	189	802	310	0	0	2006	1	0	5	1
267	34	1	59457.7	1.179262	14	1	6	797	202	0	0	2007	1	0	9	1
268	34	656200	57744.96	1.250548	21	1	1	792	165	0	0	2008	1	0	5	1
269	34	658412.6	43882.18	1.279804	19	1	3	648	133	0	0	2009	1	0	5	1
270	34	647235.1	37133.06	1.284916	12	1	2	678	85	0	1	2010	1	0	3	1
271	34	639194.1	47535.73	1.328668	16	1	1	947	391	0	1	2011	1	0	2	1
272	34	1	43183.86	1.380691	1	1	1	1	4	0	1	2012	1	0	2	1
273	35	1	49823.04	1	1	1	2	633	7	1	1	2005	1	0	2	1
274	35	1	50867.32	1.079948	2	1	3	254	45	1	1	2006	1	0	1	1

275	35	1	17934.34	1.179262	1	1	3	1232	31	1	1	2007	1	0	4	1
276	35	670910.5	49142.87	1.250548	1	1	3	1232	31	1	1	2008	1	0	4	1
277	35	676844.9	51276.17	1.279804	1	1	1	1166	32	1	1	2009	1	0	5	1
278	35	683957.6	50263.75	1.284916	1	1	1	1166	32	1	1	2010	1	0	4	1
279	35	5190263	52040.05	1.328668	3	1	1	1161	41	1	1	2011	1	0	3	1
280	35	658021	50737.01	1.380691	6	1	2	1008	95	1	1	2012	1	0	1	1
281	36	1731577	46059.26	1	72	1	103	1	740	1	1	2005	0	1	47	2
282	36	1531305	45822.56	1.079948	56	1	14	1380	661	1	1	2006	0	1	45	2
283	36	1628038	84631.21	1.179262	33	1	11	1486	642	1	1	2007	0	1	43	2
284	36	1406425	49143.4	1.250548	30	1	210	1626	493	1	1	2008	0	1	43	2
285	36	1546246	39004.37	1.279804	14	1	251	1660	354	1	1	2009	0	1	23	2
286	36	1812320	39853.3	1.284916	17	1	185	1633	306	1	1	2010	0	1	20	2
287	36	2582184	39979.95	1.328668	9	1	1	1643	127	1	1	2011	0	1	32	2
288	36	4047898	38728.21	1.380691	2	1	1	1161	35	1	1	2012	0	1	31	2
289	37	489980	45543.57	1	1	1	1	1	1	1	1	2005	1	0	57	1
290	37	514047.5	44390.96	1.079948	1	1	11	168	1	0	1	2006	1	0	56	1
291	37	565976	53938.43	1.179262	1	1	6	188	1	1	1	2007	1	0	44	1
292	37	526192.6	61200.72	1.250548	1	1	16	231	3	1	1	2008	1	0	44	1
293	37	619229.6	33716.13	1.279804	1	1	11	280	6	1	1	2009	1	0	34	1
294	37	618352.3	35172.75	1.284916	1	1	12	280	6	1	1	2010	1	0	34	1
295	37	632335	49543.98	1.328668	13	1	1	231	130	1	1	2011	1	0	47	1
296	37	519776.5	46258.66	1.380691	49	1	145	1673	207	1	1	2012	1	0	42	1
297	38	247574	8400.667	1	119	1	6	280	531	0	1	2005	0	0	1	3
298	38	1	7135.951	1.079948	73	1	3	191	888	0	1	2006	0	0	1	3
299	38	1	37012.16	1.179262	78	1	1	255	550	0	1	2007	0	0	1	3
300	38	1	46870.84	1.250548	94	1	1	250	527	1	1	2008	0	0	1	3
301	38	294515.8	37835.31	1.279804	39	1	1	245	234	1	0	2009	0	0	1	3
302	38	227295.7	48130.45	1.284916	27	1	1	270	160	1	0	2010	0	0	1	3
303	38	430522	21384.42	1.328668	15	1	1	279	125	1	0	2011	0	0	1	3
304	38	399005	27438.36	1.380691	1	1	30	168	74	1	0	2012	0	0	1	3
305	39	198554	1	1	50	3	1	90	580	0	0	2005	1	0	1	1
306	39	1	1	1.079948	35	3	1	65	450	0	0	2006	1	0	1	1

307	39	261351.3	63184.48	1.179262	16	2	1	61	252	0	1	2007	1	0	1	1
308	39	270875.6	1	1.250548	16	2	1	65	299	0	1	2008	1	0	1	1
309	39	263872.9	1	1.279804	26	1	1	70	290	0	1	2009	1	0	1	1
310	39	200312.4	1	1.284916	32	1	1	68	274	0	1	2010	1	0	1	1
311	39	221437.7	31534.55	1.328668	1	1	1	1	1	0	1	2011	1	0	1	1
312	39	243811.8	28446.94	1.380691	34	1	1	288	301	0	1	2012	1	0	1	1
313	40	12955000	45057.32	1	1	1	81	756	1	1	1	2005	1	0	249	1
314	40	12761504	27234.32	1.079948	1	1	92	1091	1	1	1	2006	1	0	231	1
315	40	11213824	47430.13	1.179262	1	1	204	1	1	1	1	2007	1	0	202	1
316	40	12027222	44808.66	1.250548	1	1	256	1157	1	1	1	2008	1	0	201	1
317	40	10029912	33910.32	1.279804	1	1	164	1277	1	1	1	2009	1	0	119	1
318	40	12767113	35151.13	1.284916	1	1	164	1331	1	1	1	2010	1	0	129	1
319	40	5745010	43227.85	1.328668	20	1	1	1406	125	1	1	2011	1	0	182	1
320	40	2483888	41062.43	1.380691	16	2	1	67	103	1	1	2012	1	0	147	1
321	41	387621	33516.33	1	93	2	1	142	602	1	1	2005	1	0	1	1
322	41	1730849	34973.8	1.079948	150	1	1	197	511	1	1	2006	1	0	1	1
323	41	1746262	56069.44	1.179262	50	1	1	172	430	1	1	2007	1	0	1	1
324	41	1982452	55637.58	1.250548	34	1	1	304	358	1	1	2008	1	0	2	1
325	41	3026103	30677.69	1.279804	16	1	1	283	181	1	0	2009	1	0	3	1
326	41	2412090	30331.57	1.284916	35	1	3	269	207	1	0	2010	1	0	1	1
327	41	2218188	26817.43	1.328668	21	1	1	272	30	1	0	2011	1	0	1	1
328	41	1	32940.44	1.380691	1	1	121	1663	11	1	0	2012	1	0	1	1
329	42	399950	31171.43	1	110	1	1	271	486	0	0	2005	0	1	1	2
330	42	438122.9	36739.74	1.079948	86	1	1	257	417	0	0	2006	0	1	3	2
331	42	564929.5	36777.6	1.179262	95	1	1	230	380	0	0	2007	0	1	4	2
332	42	1	1	1.250548	1	1	1	243	1	0	0	2008	0	1	3	2
333	42	569939.6	40454.84	1.279804	28	1	1	357	283	0	0	2009	0	1	1	2
334	42	559252.7	40654.8	1.284916	33	1	1	357	265	0	0	2010	0	1	1	2
335	42	1	51957.11	1.328668	1	1	1	1	1	0	0	2011	0	1	1	2
336	42	847535.9	1	1.380691	26	1	1	239	188	0	0	2012	0	1	1	2
337	43	1330747	1	1	189	1	5	1584	1048	1	0	2005	0	1	31	2
338	43	1715163	1	1.079948	205	3	3	1192	996	0	0	2006	0	1	18	2

339	43	1371204	82781.2	1.179262	164	3	4	1092	893	0	0	2007	0	1	28	2
340	43	1455144	80164.24	1.250548	157	1	4	1329	795	0	0	2008	0	1	28	2
341	43	1350254	39456.82	1.279804	99	1	3	1368	567	0	0	2009	0	1	20	2
342	43	1364609	40672.46	1.284916	97	1	7	1240	620	0	0	2010	0	1	37	2
343	43	1276064	69719.07	1.328668	11	1	1	1368	71	0	1	2011	0	1	41	2
344	43	2175735	68518.39	1.380691	48	1	1	383	325	0	1	2012	0	1	40	2
345	44	40371	3417.928	1	47	2	1	104	54	0	1	2005	0	0	1	3
346	44	37536.87	2271.481	1.079948	35	1	1	94	42	0	1	2006	0	0	1	3
347	44	34767.15	10094.88	1.179262	30	1	1	94	38	0	1	2007	0	0	1	3
348	44	1	963.8068	1.250548	15	1	1	92	49	0	1	2008	0	0	1	3
349	44	1	21884.07	1.279804	12	1	1	91	64	0	1	2009	0	0	1	3
350	44	31321.4	3631.131	1.284916	8	1	1	96	45	0	1	2010	0	0	1	3
351	44	31377.1	3003.716	1.328668	17	1	1	29	84	0	1	2011	0	0	1	3
352	44	28877.91	2763.767	1.380691	88	1	3	1484	500	0	1	2012	0	0	1	3
353	45	949531	35714.55	1	512	1	53	816	1812	1	1	2005	0	1	21	2
354	45	1136091	36292.5	1.079948	468	1	1	794	1795	1	1	2006	0	1	12	2
355	45	1072015	26228.82	1.179262	337	1	1	562	1306	1	1	2007	0	1	15	2
356	45	1015523	41229.81	1.250548	305	1	6	700	1217	1	1	2008	0	1	14	2
357	45	975185.3	29300.47	1.279804	176	1	9	702	885	1	1	2009	0	1	20	2
358	45	925112.8	30169.67	1.284916	200	1	10	684	862	1	1	2010	0	1	15	2
359	45	936576.1	25803.43	1.328668	1	1	1	623	117	1	1	2011	0	1	14	2
360	45	1540573	37408.47	1.380691	12	1	1	92	160	1	1	2012	0	1	22	2
361	46	2482582	97393.94	1	5	1	15	1463	400	1	1	2005	1	0	23	1
362	46	6562201	70141.34	1.079948	5	1	10	1361	249	1	1	2006	1	0	16	1
363	46	3688563	68295.7	1.179262	12	1	6	1593	180	1	1	2007	1	0	20	1
364	46	2408975	60958.72	1.250548	4	1	4	1554	174	1	1	2008	1	0	18	1
365	46	3534753	54109.08	1.279804	2	1	16	1500	168	1	1	2009	1	0	8	1
366	46	3031879	50872.48	1.284916	12	1	30	1418	224	1	1	2010	1	0	14	1
367	46	4302319	54409.5	1.328668	12	1	1	1458	36	1	1	2011	1	0	18	1
368	46	4673269	56618.84	1.380691	164	1	8	583	580	1	1	2012	1	0	4	1
369	47	132959	32485.33	1	44	1	1	6	151	0	1	2005	0	0	1	3
370	47	5912.989	46334.32	1.079948	39	1	1	27	162	0	1	2006	0	0	1	3

371	47	6635.134	41594.44	1.179262	22	1	1	25	139	0	1	2007	0	0	1	3
372	47	171296	43688.9	1.250548	52	1	1	28	135	0	1	2008	0	0	1	3
373	47	173734	20747.6	1.279804	21	1	1	31	95	0	1	2009	0	0	1	3
374	47	167498.5	33045.91	1.284916	21	1	1	31	95	0	1	2010	0	0	1	3
375	47	175704.4	35462.82	1.328668	7	1	1	30	31	0	1	2011	0	0	1	3
376	47	6244.386	16985.42	1.380691	5	1	5	1709	118	0	1	2012	0	0	1	3
377	48	620749	33555.79	1	4	1	1	173	271	1	1	2005	0	0	1	3
378	48	1	40644.83	1.079948	7	1	1	308	261	1	1	2006	0	0	1	3
379	48	1	1	1.179262	2	1	2	285	213	1	0	2007	0	0	2	3
380	48	1	41550.36	1.250548	4	1	1	294	204	1	0	2008	0	0	1	3
381	48	1	34454.29	1.279804	7	1	1	293	173	1	0	2009	0	0	1	3
382	48	1	33433.45	1.284916	2	1	1	301	146	1	0	2010	0	0	1	3
383	48	1437737	30732.43	1.328668	12	1	1	297	178	1	1	2011	0	0	1	3
384	48	1	38178.37	1.380691	19	1	1	27	77	1	0	2012	0	0	1	3
385	49	4615	68800	1	1	1	1	376	53	0	1	2005	0	0	8	3
386	49	1	47506.4	1.079948	1	1	1	430	46	0	1	2006	0	0	1	3
387	49	1	65213.89	1.179262	1	1	2	382	53	0	1	2007	0	0	1	3
388	49	1	54412.13	1.250548	1	1	1	375	35	0	1	2008	0	0	1	3
389	49	1	54805.33	1.279804	1	1	2	261	26	0	1	2009	0	0	1	3
390	49	1	54857.9	1.284916	1	1	2	261	26	0	1	2010	0	0	1	3
391	49	1	54486.34	1.328668	6	1	1	551	22	0	1	2011	0	0	2	3
392	49	856933.6	40358.7	1.380691	1	1	1	301	141	0	1	2012	0	1	1	2
393	50	775200	42708.33	1	251	3	1	270	936	1	1	2005	0	1	1	2
394	50	720721.8	64047.65	1.079948	188	2	1	169	1109	1	1	2006	0	1	3	2
395	50	719169.9	58333.24	1.179262	139	1	1	182	889	1	1	2007	0	1	1	2
396	50	740505.6	41140.48	1.250548	141	20	1	225	712	1	1	2008	0	1	1	2
397	50	744233.3	34137.83	1.279804	66	2	1	136	520	1	1	2009	0	1	1	2
398	50	642121.1	41735.57	1.284916	61	2	1	146	583	1	1	2010	0	1	1	2
399	50	650154.7	40454.07	1.328668	18	1	1	217	40	1	1	2011	0	1	4	2
400	50	960080.8	29125.11	1.380691	16	1	5	516	182	1	1	2012	0	1	1	2
401	51	1	1	1	38	1	1	11	119	0	1	2005	0	0	1	3
402	51	1	5062.157	1.079948	37	1	1	11	143	0	1	2006	0	0	1	3

403	51	1	3791.505	1.179262	12	1	1	10	39	0	0	2007	0	0	1	3
404	51	1	10402.99	1.250548	18	1	1	10	68	0	0	2008	0	0	1	3
405	51	1	1	1.279804	1	1	1	27	1	0	0	2009	0	0	1	3
406	51	25091.14	1	1.284916	12	1	1	47	27	0	0	2010	0	0	1	3
407	51	23879.96	1	1.328668	22	1	1	23	56	0	0	2011	0	0	1	3
408	51	24244.28	8060.987	1.380691	68	1	1	194	446	0	0	2012	0	0	1	3
409	52	1056179	42121.19	1	64	1	8	1	471	2	1	2005	0	1	12	2
410	52	978331.1	80799.82	1.079948	48	1	39	717	469	1	1	2006	0	1	8	2
411	52	1017236	49254.77	1.179262	60	2	4	615	513	0	1	2007	0	1	6	2
412	52	1053686	29373.16	1.250548	76	1	1	690	472	0	1	2008	0	1	7	2
413	52	1062499	32553.12	1.279804	40	2	6	1	290	0	1	2009	0	1	9	2
414	52	1078115	30898.15	1.284916	38	1	2	1	265	0	1	2010	0	1	8	2
415	52	998885.7	38456.77	1.328668	1	1	1	1	1	1	1	2011	0	1	14	2
416	52	1553830	27552.56	1.380691	9	1	1	77	47	0	1	2012	0	1	10	2
417	53	68250	30350.29	1	29	3	1	75	196	0	1	2005	0	0	1	3
418	53	68171.69	31630.7	1.079948	17	2	2	67	129	0	1	2006	0	0	1	3
419	53	75985.55	31666.65	1.179262	19	3	3	92	120	0	1	2007	0	0	1	3
420	53	72652.67	1	1.250548	18	1	1	97	104	0	1	2008	0	0	1	3
421	53	69414.88	20295.08	1.279804	14	1	1	84	47	0	1	2009	0	0	1	3
422	53	70857.08	1	1.284916	13	1	1	78	61	0	1	2010	0	0	1	3
423	53	74587.4	25778.48	1.328668	1	1	1	1	1	0	1	2011	0	0	1	3
424	53	116075.6	28520.35	1.380691	36	1	5	630	242	0	1	2012	0	0	1	3
425	54	1	35666.67	1	25	1	2	171	528	0	1	2005	1	0	2	1
426	54	939102.3	65775.59	1.079948	40	1	1	124	606	0	1	2006	1	0	1	1
427	54	942745.4	1	1.179262	22	1	1	260	371	0	0	2007	1	0	1	1
428	54	988029.5	33743.64	1.250548	29	1	1	194	462	0	0	2008	1	0	1	1
429	54	868602.1	36695.9	1.279804	17	1	1	177	357	0	0	2009	1	0	1	1
430	54	733585.4	32155.82	1.284916	27	1	1	177	348	0	0	2010	1	0	2	1
431	54	715268.5	58440.99	1.328668	85	1	1	80	451	0	0	2011	1	0	1	1
432	54	738404.3	30984.42	1.380691	13	1	1	70	50	0	0	2012	1	0	1	1
433	55	1	1	1	1	1	1	1	1	0	1	2005	0	0	1	3
434	55	1	1	1.079948	38	1	1	20	92	0	1	2006	0	0	1	3

435	55	1	1	1.179262	1	1	1	1	1	0	1	2007	0	0	1	3
436	55	19917.76	1	1.250548	21	1	1	37	69	0	1	2008	0	0	1	3
437	55	22437.71	1	1.279804	1	1	1	1	1	0	1	2009	0	0	1	3
438	55	23270.95	1	1.284916	1	1	1	1	1	0	1	2010	0	0	1	3
439	55	20299.68	1	1.328668	1	1	1	1	1	0	1	2011	0	0	1	3
440	55	19440.51	1	1.380691	14	5	1	181	554	0	1	2012	0	0	1	3
441	56	58943	1539.778	1	15	1	1	35	25	0	1	2005	0	0	2	3
442	56	24046.22	9097.281	1.079948	9	1	1	36	104	0	1	2006	0	0	2	3
443	56	22856.14	29549.1	1.179262	9	1	1	36	87	0	1	2007	0	0	1	3
444	56	22496.17	8484.253	1.250548	5	1	1	36	61	0	1	2008	0	0	1	3
445	56	24841.29	5360.66	1.279804	7	1	1	46	52	0	1	2009	0	0	1	3
446	56	25433.22	5501.994	1.284916	9	1	1	40	33	0	1	2010	0	0	2	3
447	56	29226.65	1733.519	1.328668	50	50	3	54	233	0	1	2011	0	0	1	3
448	56	70805.12	2878.924	1.380691	6	1	1	23	41	0	1	2012	0	0	1	3
449	57	44291	4500	1	15	1	1	15	244	0	1	2005	0	0	1	3
450	57	43454.73	22799.36	1.079948	21	1	1	15	178	0	1	2006	0	0	1	3
451	57	1	1	1.179262	13	1	1	8	154	0	1	2007	0	0	1	3
452	57	1	1	1.250548	17	1	1	12	112	0	1	2008	0	0	1	3
453	57	1	1	1.279804	6	1	1	16	98	0	1	2009	0	0	1	3
454	57	1	1	1.284916	9	1	1	16	116	0	1	2010	0	0	1	3
455	57	42076.63	3411.548	1.328668	1	1	1	1	1	0	1	2011	0	0	1	3
456	57	95062.36	7527.317	1.380691	8	1	1	75	65	0	1	2012	0	0	1	3
457	58	77354	1	1	53	1	1	118	400	0	1	2005	0	0	1	3
458	58	1	3505.544	1.079948	34	1	1	108	254	0	1	2006	0	0	1	3
459	58	1	1	1.179262	16	1	1	105	120	0	1	2007	0	0	1	3
460	58	1	3305.398	1.250548	18	1	1	92	104	0	1	2008	0	0	1	3
461	58	67542.48	28886.97	1.279804	11	1	1	87	180	0	1	2009	0	0	1	3
462	58	63723.03	34611.31	1.284916	9	1	1	51	159	0	1	2010	0	0	2	3
463	58	154362.4	1	1.328668	5	1	1	44	199	0	1	2011	0	0	1	3
464	58	137543.2	1	1.380691	1	1	1	16	97	0	1	2012	0	0	3	3
465	59	85325	46666.67	1	10	1	1	176	36	0	1	2005	0	0	1	3
466	59	700444.9	49396.92	1.079948	1	1	1	1	1	0	1	2006	0	0	1	3

467	59	707829.4	1	1.179262	1	1	1	1	1	0	1	2007	0	0	1	3
468	59	749641.6	26205.45	1.250548	5	1	1	81	10	1	1	2008	0	0	1	3
469	59	756864.9	15464.7	1.279804	16	1	1	79	39	0	1	2009	0	0	1	3
470	59	763523.2	1	1.284916	4	1	1	85	12	0	1	2010	0	0	2	3
471	59	763069.7	1	1.328668	85	1	10	75	1755	0	1	2011	0	0	3	3
472	59	117321.9	14696.33	1.380691	7	1	1	43	213	0	1	2012	0	0	4	3
473	60	449602	57551.13	1	34	1	1	745	172	0	1	2005	1	0	1	1
474	60	1	1	1.079948	16	1	4	786	173	0	1	2006	1	0	1	1
475	60	737447.8	1	1.179262	92	1	1	786	165	0	1	2007	1	0	1	1
476	60	703120	45767.05	1.250548	31	1	4	806	200	0	1	2008	1	0	2	1
477	60	939415.1	41065.62	1.279804	40	1	3	827	139	0	1	2009	1	0	1	1
478	60	846183.6	43151.23	1.284916	29	1	1	827	216	0	1	2010	1	0	3	1
479	60	920116	43745.3	1.328668	1	1	1	1	1	0	1	2011	1	0	1	1
480	60	1	43145.47	1.380691	2	1	1	107	92	0	1	2012	0	0	1	NA
481	61	5666642	61849.59	1	30	1	14	398	218	1	1	2005	1	0	19	1
482	61	5516430	61260.02	1.079948	1	1	14	424	221	1	1	2006	1	0	26	1
483	61	5462379	58503.22	1.179262	1	1	9	424	221	1	1	2007	1	0	20	1
484	61	5410217	54812.99	1.250548	43	1	25	326	276	1	1	2008	1	0	29	1
485	61	6017786	46320.39	1.279804	13	1	59	873	154	1	1	2009	1	0	18	1
486	61	6251611	48369.05	1.284916	108	1	29	879	248	1	1	2010	1	0	32	1
487	61	6056663	49443.08	1.328668	22	1	184	399	208	1	1	2011	1	0	21	1
488	61	5807587	48609.52	1.380691	108	1	11	700	202	1	1	2012	1	0	15	1
489	62	6809717	52659.89	1	40	1	1	366	54	0	1	2005	0	0	4	3
490	62	179228.6	54319.71	1.079948	41	1	1	364	69	0	1	2006	0	0	6	3
491	62	175102.1	63153.05	1.179262	28	1	1	398	47	0	1	2007	0	0	5	3
492	62	184767.3	47226.23	1.250548	43	1	1	386	35	0	1	2008	0	0	8	3
493	62	180886.9	21937.44	1.279804	2	1	1	377	149	0	0	2009	0	0	2	3
494	62	149530.5	45473.64	1.284916	14	1	1	98	62	0	0	2010	0	0	1	3
495	62	706391.6	38559.92	1.328668	99	1	3	263	567	0	0	2011	0	0	2	3
496	62	1	38874.11	1.380691	22	1	1	313	62	0	0	2012	0	0	1	3
497	63	861722	50939.58	1	1	1	3	466	16	1	0	2005	1	0	11	1
498	63	77632.08	49733.98	1.079948	1	1	40	538	20	1	0	2006	1	0	12	1

499	63	73457.57	1	1.179262	2	1	12	235	26	1	1	2007	1	0	6	1
500	63	75002.52	37120.59	1.250548	2	1	15	283	20	1	1	2008	1	0	7	1
501	63	73260.62	38751.02	1.279804	1	2	15	283	20	1	1	2009	1	0	7	1
502	63	78235.08	38080.14	1.284916	1	1	12	529	16	1	1	2010	1	0	12	1
503	63	71675.02	35793.46	1.328668	180	1	7	336	753	1	1	2011	1	0	5	1
504	63	468600.2	43198.64	1.380691	1	2	35	398	13	1	1	2012	1	0	1	1
505	64	2030390	51649.73	1	407	3	25	1132	1614	1	1	2005	0	1	23	2
506	64	1890858	50863.77	1.079948	411	5	25	1539	1763	1	1	2006	0	1	24	2
507	64	1792679	76825.38	1.179262	291	2	5	724	1517	1	1	2007	0	1	30	2
508	64	1367144	75620.59	1.250548	330	2	12	1422	1314	1	1	2008	0	1	47	2
509	64	1355024	43991.5	1.279804	126	1	6	2005	953	0	1	2009	0	1	35	2
510	64	1023753	45899.25	1.284916	200	5	6	2175	973	0	1	2010	0	1	49	2
511	64	1650913	36910.1	1.328668	202	1	7	1939	788	0	1	2011	0	1	29	2
512	64	2340300	37426.01	1.380691	202	1	4	1939	788	0	1	2012	0	1	33	2
513	65	452129	47539.63	1	25	1	1	369	247	1	1	2005	0	1	2	2
514	65	537955.5	31466.8	1.079948	15	1	1	563	757	1	1	2006	0	1	4	2
515	65	579325.9	33169.73	1.179262	5	1	1	387	290	1	1	2007	0	1	3	2
516	65	509971.3	30063.17	1.250548	21	2	1	361	494	1	1	2008	0	1	2	2
517	65	611736.3	27875.88	1.279804	9	1	1	373	212	1	1	2009	0	1	1	2
518	65	596977.1	36504.12	1.284916	7	1	1	401	538	1	1	2010	0	1	1	2
519	65	675699.1	32260.56	1.328668	22	1	24	491	249	1	1	2011	0	1	3	2
520	65	1129560	38659.47	1.380691	7	1	1	266	459	1	1	2012	0	1	1	2
521	66	851852	31570.67	1	73	3	56	372	444	0	1	2005	0	1	43	2
522	66	797316.1	38584.35	1.079948	96	3	56	359	474	1	1	2006	0	1	28	2
523	66	856739.9	49598.57	1.179262	88	8	50	256	406	1	1	2007	0	1	25	2
524	66	861184.3	47168.34	1.250548	111	5	33	373	387	1	1	2008	0	1	25	2
525	66	964172.9	30501.89	1.279804	48	1	3	313	345	1	1	2009	0	1	16	2
526	66	946093.6	34053.44	1.284916	48	1	3	313	345	1	1	2010	0	1	19	2
527	66	922455.4	38869.07	1.328668	37	1	3	313	163	1	1	2011	0	1	20	2
528	66	1668677	41834.61	1.380691	48	1	2	681	495	1	1	2012	0	1	17	2
529	67	292112	56514.8	1	18	1	8	561	110	0	1	2005	1	0	3	1
530	67	294506.6	51417.5	1.079948	21	1	3	587	79	0	1	2006	1	0	5	1

531	67	301610.4	35909.16	1.179262	12	1	1	616	85	0	1	2007	1	0	6	1
532	67	302533.4	32367.72	1.250548	16	1	1	639	88	0	1	2008	1	0	2	1
533	67	317804.8	28737.89	1.279804	8	8	1	678	57	0	1	2009	1	0	2	1
534	67	315684.1	29320.34	1.284916	8	8	1	678	57	0	1	2010	1	0	1	1
535	67	385649	29554.27	1.328668	48	1	3	637	345	0	1	2011	1	0	1	1
536	67	327514.2	31697.82	1.380691	2	1	6	720	37	0	1	2012	1	0	3	1
537	68	36784	76980.76	1	33	1	1	46	45	0	1	2005	0	0	1	3
538	68	33256.43	22039.07	1.079948	37	1	1	54	147	0	1	2006	0	0	1	3
539	68	34333.03	11395.37	1.179262	29	1	1	27	129	0	1	2007	0	0	1	3
540	68	32151.68	4721.573	1.250548	18	1	1	35	113	0	1	2008	0	0	1	3
541	68	34149.21	1	1.279804	1	1	1	48	14	0	1	2009	0	0	1	3
542	68	33508.87	1	1.284916	12	1	1	49	22	0	1	2010	0	0	2	3
543	68	33344.76	1	1.328668	64	1	5	49	298	0	1	2011	0	0	1	3
544	68	32770.5	1	1.380691	12	1	1	492	45	0	1	2012	0	0	1	3
545	69	2362202	97000	1	1	1	205	1196	5	1	1	2005	1	0	133	1
546	69	2747145	19981.5	1.079948	1	1	222	2043	11	1	1	2006	1	0	86	1
547	69	2919199	31104.1	1.179262	1	1	268	1539	10	1	1	2007	1	0	69	1
548	69	2978115	32394.54	1.250548	1	1	256	2113	11	1	1	2008	1	0	129	1
549	69	2906294	28437.12	1.279804	1	1	256	2113	11	1	1	2009	1	0	94	1
550	69	2920601	28693.24	1.284916	1	1	173	1477	5	1	1	2010	1	0	179	1
551	69	2921171	34063.13	1.328668	4	1	16	2086	41	1	1	2011	1	0	111	1
552	69	2639398	1	1.380691	16	1	1	37	134	1	1	2012	1	0	83	1
553	70	1162323	60657.33	1	10	1	1	911	69	1	1	2005	0	1	14	2
554	70	1207278	63438.73	1.079948	6	1	17	818	80	1	1	2006	0	1	15	2
555	70	1272621	49088.46	1.179262	2	1	48	707	57	1	1	2007	0	1	2	2
556	70	1274233	54761.4	1.250548	1	1	28	624	36	1	1	2008	0	1	21	2
557	70	1542315	38729.26	1.279804	1	1	28	888	36	1	1	2009	0	1	6	2
558	70	1421891	44369.7	1.284916	6	1	13	1491	50	1	1	2010	0	1	3	2
559	70	1449713	45868.54	1.328668	1	1	1	1014	1	1	1	2011	0	1	3	2
560	70	1897349	47308.61	1.380691	1	1	74	1695	13	1	1	2012	0	1	3	2
561	71	334141	64333.33	1	2	1	2	697	1	1	1	2005	1	0	18	1
562	71	300528.6	64904.64	1.079948	1	1	2	691	1	1	1	2006	1	0	18	1

563	71	302875.8	34755.46	1.179262	2	1	4	464	1	1	1	2007	1	0	19	1
564	71	316288.3	28914.2	1.250548	2	1	3	470	1	1	1	2008	1	0	1	1
565	71	329907.2	36408.64	1.279804	1	1	5	268	1	1	1	2009	1	0	20	1
566	71	1	35725.94	1.284916	1	1	5	268	1	1	1	2010	1	0	24	1
567	71	1	35967.27	1.328668	3	1	1	460	34	1	1	2011	1	0	16	1
568	71	831973.3	35384.61	1.380691	1	1	3	558	1	0	0	2012	1	0	12	1
569	72	77849	51806.91	1	30	1	1	110	374	0	0	2005	0	0	1	3
570	72	78563.71	1	1.079948	1	1	1	1	1	0	0	2006	0	0	1	3
571	72	66939.97	1	1.179262	11	1	1	29	242	1	0	2007	0	0	1	3
572	72	73910.21	50353.98	1.250548	14	1	1	199	219	1	0	2008	0	0	3	3
573	72	115786.6	1	1.279804	16	1	1	135	70	1	0	2009	0	0	1	3
574	72	179952.7	1	1.284916	1	1	1	1	1	1	1	2010	0	0	1	3
575	72	113249	41865.74	1.328668	1	1	1	1	1	1	1	2011	0	0	1	3
576	72	119209.9	43042.55	1.380691	1	1	1	1	146	1	1	2012	0	0	1	3
577	73	1398210	44551.25	1	51	2	1	665	888	1	1	2005	0	1	1	2
578	73	1240229	50541.57	1.079948	67	1	1	580	701	1	1	2006	0	1	1	2
579	73	1416427	59714.98	1.179262	42	1	1	476	583	1	1	2007	0	1	1	2
580	73	1635745	54911.49	1.250548	46	1	10	620	598	1	1	2008	0	1	1	2
581	73	1247674	46853.5	1.279804	33	1	12	571	380	1	1	2009	0	1	1	2
582	73	1224279	30967.58	1.284916	33	1	12	565	391	0	1	2010	0	1	1	2
583	73	1274028	48442.44	1.328668	163	1	1	397	1111	1	1	2011	0	1	1	2
584	73	1666755	35704.41	1.380691	95	1	1	464	373	1	1	2012	0	1	1	2
585	74	285426	64300.86	1	45	1	2	121	516	0	1	2005	1	0	1	1
586	74	1202262	60076.96	1.079948	44	1	2	86	438	0	1	2006	1	0	1	1
587	74	1272998	40687.05	1.179262	26	1	1	140	364	0	1	2007	1	0	2	1
588	74	1264882	35510.05	1.250548	38	1	1	160	369	0	1	2008	1	0	1	1
589	74	1322887	24628.29	1.279804	15	1	1	217	143	0	1	2009	1	0	1	1
590	74	218229	8698.737	1.284916	26	1	1	176	125	0	1	2010	1	0	2	1
591	74	1581861	32623.51	1.328668	130	5	1	268	858	0	1	2011	1	0	1	1
592	74	2329338	28706.81	1.380691	50	1	1	144	160	0	1	2012	1	0	1	1
593	75	453650	66759.73	1	1	1	1	192	43	1	1	2005	1	0	1	1
594	75	379759.2	39171.09	1.079948	1	1	2	151	33	1	1	2006	1	0	3	1

595	75	362060.3	36263.85	1.179262	1	1	2	123	33	1	1	2007	1	0	4	1
596	75	398336.8	38506.61	1.250548	3	1	4	165	23	1	1	2008	1	0	5	1
597	75	418755.3	36886.46	1.279804	2	1	1	264	32	1	1	2009	1	0	3	1
598	75	442779.1	38703	1.284916	2	1	1	266	35	1	1	2010	1	0	2	1
599	75	414132.2	36258.61	1.328668	9	1	1	287	459	1	1	2011	1	0	2	1
600	75	352727.5	282258.3	1.380691	2	1	1	246	19	1	1	2012	1	0	2	1

Appendix 2 – Elasticity of Scale Estimates

Note: DISTRICT_NUM=49 is a jurisdiction that merged with another jurisdiction, and there are missing data for TOT_COST_REAL in most years throughout our sample (coded as "1" in our dataset). The elasticity of scale estimate for observation 49 is negative, but we omit it from our results in Tables 5a, 5b, 5c, 5d because there is inadequate total cost data to compute a reliable average elasticity for this jurisdiction. Therefore, our results cover 74 jurisdictions.

DISTRICT_NUM	ELAS_OF_SCALE_MEAN_DATA
1	0.129349
2	0.378898
3	0.247605
4	0.092210
5	0.116754
6	0.265415
7	0.228411
8	0.118069
9	0.038958
10	0.024645
11	0.175625
12	0.119848
13	0.248713
14	0.072193
15	0.080605
16	0.327054
17	0.139805
18	0.288715
19	0.067192
20	0.322746
21	0.082823
22	0.146694
23	0.263732
24	0.202993
25	0.264813
26	0.342747
27	0.298788
28	0.232306
29	0.047161
30	0.119479
31	0.263032
32	0.259488
33	0.036726
34	0.144015
35	0.042450
36	0.379886
37	0.267752
38	0.269845
39	0.119011
40	0.336896
41	0.184366
42	0.176619
43	0.279652
44	0.177193
45	0.380446

46	0.263477
47	0.161873
48	0.050716
49	-0.035291
50	0.226838
51	0.146907
52	0.266333
53	0.153183
54	0.131425
55	0.063421
56	0.138813
57	0.081503
58	0.093629
59	0.133179
60	0.193027
61	0.368201
62	0.174098
63	0.294514
64	0.388650
65	0.150855
66	0.364767
67	0.179660
68	0.162066
69	0.331226
70	0.220358
71	0.132475
72	0.069413
73	0.257894
74	0.167598
75	0.034708

Appendix 3 – Economies of Scope Estimates

SCOPE_FOOD_LEAD	-0.018977
SCOPE_FOOD_SEPTIC	-0.023105
SCOPE_LEAD_SEPTIC	-0.008518
SCOPE_WATER_FOOD	0.007207
SCOPE_WATER_LEAD	0.048250
SCOPE_WATER_SEPTIC	-0.062385

Appendix 4 – EViews code for cost function estimation, and computation of elasticities for economies of scale and economies of scope

```
smpl 1 600

'# here we select only the observations for which tot_cost_real has nonzero and non-missing values:

smpl if tot_cost_real>1

equation eq_revised_Oct14.ls log(tot_cost_real) c(1) log(wage_avg_real)*log(pk) (log(water_priv_well_permits+
water_pub_well_permits))^2 (log(lead_inspections))^2 (log(food_insp_all_classes))^2 (log(septic_total))^2
log(septic_total)*log(water_priv_well_permits+ water_pub_well_permits)  log(septic_total)*log(lead_inspections)
log(septic_total)*log(food_insp_all_classes)  log(water_priv_well_permits+
water_pub_well_permits)*log(food_insp_all_classes)   log(water_priv_well_permits+
water_pub_well_permits)*log(lead_inspections) log(lead_inspections)*log(food_insp_all_classes)
log(wage_avg_real)^2 anynursestaff rural_urban2000 year distr1 distr2 cumulativestats_over10 log(pk)^2

genr dcdY1=0
genr dcdY2=0
genr dcdY3=0
genr dcdY4=0

'#calculate elasticities of scope

genr dcdY1 = 2*c(3)*(log(water_priv_well_permits+ water_pub_well_permits)) +   c(7)*log(septic_total) +
c(10)*log(food_insp_all_classes)  + c(11)*log(lead_inspections)

scalar scope_water_septic=c(7)
scalar scope_water_food=c(10)
scalar scope_water_lead=c(11)


genr dcdY2 = 2*c(4)*(log(lead_inspections)) + c(8)*log(septic_total) + c(11)*log(water_priv_well_permits+
water_pub_well_permits) + c(12)*log(food_insp_all_classes)

scalar scope_lead_septic=c(8)


genr dcdY3 = 2*c(5)*(log(food_insp_all_classes)) + c(9)*log(septic_total) + c(10)*log(water_priv_well_permits+
water_pub_well_permits) + c(12)*log(lead_inspections)

scalar scope_food_septic=c(9)
scalar scope_food_lead=c(12)

genr dcdY4 = 2*c(6)*(log(septic_total)) + c(7)*log(water_priv_well_permits+ water_pub_well_permits)  +
c(8)*log(lead_inspections) + c(9)*log(food_insp_all_classes)


'calculate elasticities of scale based on mean of the data;

scalar mean_water=@mean((water_priv_well_permits+ water_pub_well_permits))

scalar mean_septic=@mean((septic_total))

scalar mean_lead=@mean((lead_inspections))

scalar mean_food=@mean((food_insp_all_classes))

scalar dcdY1_alt = 2*c(3)*log(mean_water) +   c(7)*log(mean_septic) + c(10)*log(mean_food) +
c(11)*log(mean_lead)
```

```
scalar dcdY2_alt = 2*c(4)*log(mean_lead) + c(8)*log(mean_septic) + c(11)*log(mean_water) + c(12)*log(mean_food)

scalar dcdY3_alt = 2*c(5)*log(mean_food) + c(9)*log(mean_septic) + c(10)*log(mean_water) + c(12)*log(mean_lead)


scalar dcdY4_alt = 2*c(6)*log(mean_septic) + c(7)*log(mean_water) + c(8)*log(mean_lead)+ c(9)*log(mean_food)

scalar elas_of_scale_alt = dcdY1_alt + dcdY2_alt + dcdY3_alt + dcdY4_alt

smpl 1 600 if tot_cost_real>1

for !i = 1 to 75

smpl if d!i=1 and tot_cost_real>1

scalar mean_water!i=@mean((water_priv_well_permits+ water_pub_well_permits))

scalar mean_septic!i=@mean((septic_total))

scalar mean_lead!i=@mean((lead_inspections))

scalar mean_food!i=@mean((food_insp_all_classes))

scalar dcdY1_alt!i = 2*c(3)*log(mean_water!i) +   c(7)*log(mean_septic!i) + c(10)*log(mean_food!i) +
c(11)*log(mean_lead!i)

scalar dcdY2_alt!i = 2*c(4)*log(mean_lead!i) + c(8)*log(mean_septic!i) + c(11)*log(mean_water!i) +
c(12)*log(mean_food!i)

scalar dcdY3_alt!i = 2*c(5)*log(mean_food!i) + c(9)*log(mean_septic!i) + c(10)*log(mean_water!i) +
c(12)*log(mean_lead!i)


scalar dcdY4_alt!i = 2*c(6)*log(mean_septic!i) + c(7)*log(mean_water!i) + c(8)*log(mean_lead!i)+
c(9)*log(mean_food!i)

scalar elas_of_scale_alt!i = dcdY1_alt!i + dcdY2_alt!i + dcdY3_alt!i + dcdY4_alt!i

if elas_of_scale_alt!i<0 then
genr elas_negative_count=1
else
genr elas_negative_count=0
endif

smpl if year=2005 and d!i=1

series elas_of_scale_mean_data=1*elas_of_scale_alt!i

smpl 1 600


next !i

stop
```