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3 Measuring the Transaction Sector in the American Economy, 1870–1970

John Joseph Wallis and Douglass C. North

Economists since Adam Smith have extolled the benefits to humanity of specialization and the division of labor. If economists have a philosopher's stone it is the principle of comparative advantage. Output can be increased without increasing the number of producers simply by reallocating production to those producers with the lowest opportunity costs. Likewise reallocating goods and services between consumers with different preferences can increase the welfare of society without actually increasing the number of goods and services.

In recent decades economists have come to realize that the gains from specialization and the division of labor are not a free lunch. Beginning with Coase's article on "The Nature of the Firm" the role of "transaction costs"—that is, the costs of making exchanges—has become more important in explaining the structure of market and nonmarket forms of economic organization (Coase 1937, 1960). This voluminous literature offers the promise of new insights into the way economic systems evolve, but to this point it has not resulted in an empirical definition or measure of transaction costs. This paper is a preliminary attempt to identify and measure those costs in the American economy between 1870 and 1970.

Given the size of the transaction costs literature it is surprising that there has not been an attempt to measure them. Perhaps this stems

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from a general lack of consensus over what the most important elements of transaction costs are. Williamson's work focuses on the costs of cheating or opportunistic behavior, the work initiated by Stigler concentrates on the costs of obtaining information (even when no one is lying), Alchian and Demsetz take up the problem of coordinating diverse inputs in the production process, Jensen and Meckling address the principal-agent problem, and Barzel has brought to light the problems of measurement.[1] We try to encompass these various concepts of transaction costs into a single unified definition.

Another reason for the lack of empirical measures of transaction costs stems from the comparative-static nature of much of the theoretical work. For the most part the approach is to identify, theoretically, the effects of increasing or decreasing transaction costs. In that context the central distinction is between situations in which transaction costs (of whatever form) are high and situations in which they are low.[2] This is understandable, since the industrial organization literature is primarily concerned with explaining alternative forms of organization and one potential explanation is high (or low) transaction costs. Distinguishing between high and low transaction costs, however, gives us no guidelines when the problem of measuring the *level* of transaction costs is addressed, and that is the problem we face.

In a fundamental sense we have no quantitative measure of transaction costs because we do not have a clear, general theoretical concept of the costs of exchange. As Kuznets has pointed out, "no economic measure is neutral, that is unaffected by economic theories of production, value, and welfare, and the broader social philosophy encompassing them."[3] We spend the first section developing a theoretical definition of transaction costs and the transaction sector. We have three purposes. The first is to integrate these estimates into the existing transaction cost literature. Second, we hope eventually to incorporate the notion of the transaction sector into the structure of the national income and product accounts, the current standard measure of the performance of economies over time. Finally, and most apparent, we hope to provide the framework of the empirical estimates that follow in sections 3.2 and 3.3. The potential implications of integration of the transaction sector into the accounts is the subject of section 3.4.

3.1 Defining the Transaction Sector

Constructing a definition of transaction costs is no easy matter. General definitions abound. "The costs of exchanging property rights," "the costs of making and enforcing contracts," and the one that we began our investigation with, "the costs of capturing the gains from specialization and division of labor," are all too broad to be of oper-

ational use. In what follows we adopt a slightly less general notion of what transaction costs are and then translate our notion into explicit categories of economic activity consistent with the historical income accounts and labor force series.

While as economists we wish to separate transaction costs from other costs, individual economic actors have no such motivation. People maximize net benefits, the difference between total benefits and total costs, where total costs include both transaction and other costs.[4] Every economic activity involves elements of transaction and other costs. Ideally our measure of transaction costs would delve into each exchange and separate these costs. Unfortunately, data are not available for such a measure. Instead our basic approach is to segregate economic activities and actors into those that are primarily associated with making exchanges and those that are not. The sum of the resources used by those associated with transacting make up our estimate of the transaction sector.

To make clear the rationale underlying our segregation of economic activity into different categories, we employ the terms "transaction function" and "transformation function." Transaction costs are the costs associated with making exchanges, the costs of performing the transaction function. Transformation costs are the costs associated with transforming inputs into outputs, the costs of performing the transformation function. From the viewpoint of the individual both of these functions are "productive"; that is, transaction and transformation costs are incurred only if the expected benefits from doing so exceed the costs of doing so. The behavioral similarity of transaction costs and transformation costs is critical, since it implies that we do not need a new "transaction costs theory" of human behavior to deal with transaction costs; simple price theory will suffice.

Within a general economic theory of behavior, which need not draw a distinction between transaction and transformation costs, it is nevertheless possible to distinguish the two functions in a meaningful way, one that gives rise to reasonable guidelines for dividing the two functions empirically. We define inputs in the standard economic way: the land, labor, capital, and entrepreneurial skill used in the process of economic activity. To perform either the transaction or transformation function requires the use of inputs. When we speak of transaction costs we mean the economic value of the inputs used in performing the transaction function. The empirical categories of transaction costs and, for example, labor costs are not and cannot be mutually exclusive. Transaction costs include the value of the labor, land, capital, and entrepreneurial skill used in making exchanges. We measure the size of the transaction sector by determining which labor, land, and capital costs should be included in the transaction sector.

We develop the definition of transaction costs and its empirical counterpart by first examining the simple relationship between a buyer and a seller. We then examine, in turn, the transaction costs that occur within firms and through intermediaries of various types. Finally we look into the special problem of protecting property rights. For purposes of illustration, consider the production and exchange of a house.

To the consumer seeking to purchase a good (or service), we define transaction costs as all costs borne by the consumer that are not transferred to the seller of the good. In the case of the house this would encompass all of the resources expended in purchasing the house that are not transferred to the seller, including the time spent looking at houses, obtaining information on prices and alternative housing, legal fees, the costs of establishing credibility as a buyer, and so on. Note that all of these actions are part of transaction costs, although some of them result in a second transaction, for example, hiring a lawyer. In that case hiring the lawyer is part of the transaction costs of buying the house. The key element is that transaction costs are that part of the cost of purchasing the house that the producer does not receive.

On the producer's side, the transaction costs of selling (producing) the house are those costs which the producer would not incur were he selling the house to himself. While such a transaction may seem to strain our credulity, remember that the cost of owning a house is the opportunity to sell it, an opportunity forgone every day that the house is owned. In effect every owner "sells" himself his possessions on a regular basis by choosing not to sell them to someone else. The seller's transaction costs include the realtor, advertising, time spent waiting while people tramp through the house, title insurance, the cost of establishing credibility as a seller, and so on. Again, some of these transaction costs themselves are a second transaction, for example, hiring a realtor.[5]

Not all of the transaction costs, for either the buyer or seller, occur at the point of exchange. Some costs occur before the exchange. These include gathering information about prices and alternatives, ascertaining the quality of the goods and the buyer's or seller's credibility, and so on. Other costs occur at the point of exchange. These include waiting in lines, paying notaries, purchasing title insurance, etc. Finally, some transaction costs occur after the exchange. These include the cost of ensuring that the contract is enforced, monitoring performance, inspecting quality, obtaining payment, and so on. The terms "coordinating," "enacting," and "monitoring" costs refer to the time dimension of transaction costs, whether the costs occur pre, during, or post exchange.

The simple example of a single seller/producer and single buyer/consumer illustrates two aspects of transaction costs that we wish to

stress. First, a transaction cost is a cost like any other cost to both the buyer and the seller. The buyer will, for example, decide whether to acquire more information about alternative house prices, thereby incurring a transaction cost, only if he feels it will result in a commensurate reduction in the purchase cost of the house he ultimately buys (see Stigler 1961). The seller will, for example, weigh the alternative costs of expending more on advertising or lowering the asking price on the house as possible ways to attract a buyer.[6] The transaction costs and transformation costs of buying (or selling) the house are, at the appropriate margins, substitutes for one another and therefore can be treated the same theoretically.

Second, although all of the transaction costs in the exchange are borne by the buyer or the seller, some of those costs are occasioned by market activity (hiring lawyers and realtors) while others are not (time spent looking for houses or waiting for buyers to come by). While there is no conceptual difference between these two types of transaction costs, empirically they are a world apart. We can observe and measure the transaction costs embodied in the marketed services of the lawyers and realtors; we cannot observe the transaction costs of searching for houses or waiting for buyers. In our nomenclature those transaction costs which result in the exchange of a marketed good or service are the purchase of "transaction services." Transaction services are the observable element of transaction costs. In the example of the house, lawyers and realtors provide transaction *services*. We attempt to measure the level of transaction *services* provided in the economy, not the level of total transaction *costs*.

Our notion of transaction services and transaction costs is perfectly analogous to the notion of market income and total income in the national income accounts. GNP does not claim to measure the total income of individuals in a society, but the income that individuals generate through the market process (aside from imputed nonmarket items, such as owner-occupied housing and nonmarketed farm output). In the same way transaction services capture only that part of transaction costs that flows through the market.

The situation is somewhat more complicated when the seller (or buyer) is not an individual but a group of individuals: a firm. Going beyond individual buyers and sellers to the level of the firm is particularly important, since most of the available data are collected at the firm level. For illustration, consider an automobile manufacturer like Henry Ford.

Part of the transaction costs incurred by the firm are identical to those of the simple example. When Ford sells cars the transaction costs of doing so are those costs that Ford would not incur were he selling the cars to himself. Selling costs such as those associated with mar-

keting, advertising, sales agents, the legal staff, and the shipping department are all part of transaction costs. Similarly, when Ford purchases inputs from his suppliers, we apply the rule that transaction costs are those costs borne by Ford that are not transferred to the supplier. Items such as purchasing departments, receiving clerks, legal staff, personnel departments (hiring), and the like are transaction costs.

The most difficult conceptual problem is created by those transaction costs that arise within the firm. Following Coase and the industrial organization literature, we regard the firm as a bundle of contracts.[7] One way to think of the bundle is as a sequential series of contracts between owners and managers, managers and supervisors, and supervisors and workers. At the top of the sequence Henry Ford (or he and the stockholders) buys cars from his managers. Ford incurs transaction costs in that payments to accountants, lawyers, and secretarial staff are necessary for him to coordinate, enact, and monitor his exchanges with the managers. The managers in turn bear costs in producing cars for Henry Ford that would not be borne if Ford produced cars for himself; again the costs of accountants, lawyers, and secretarial staffs. A hierarchy of such exchanges would exist, down through owners, managers, supervisors, and workers.

At the top of the sequence the bulk of the transaction costs involve the processing and conveying of information, a task carried on primarily by clerical workers. As we move down the sequence toward the workers the transaction costs involve both conveying information (foremen) and monitoring the labor contract (foremen and inspectors).

In the simplest scheme, Ford purchases the firm's output and the producers (sellers) are the people actually making the cars. All of the intermediate occupations (foremen, inspectors, supervisors, clerks, and managers) generate costs that Ford bears which are not transferred to the producers. That is, Ford purchases the transaction services of the intermediate occupations in order to coordinate, enact, and monitor the exchange he makes with those who provide transformation services.

Whether we wish to think of the firm using the complicated or simple set of contracts, making detailed decisions on who does and who does not perform transaction functions in a given firm or industry is impossible short of an intimate and exhausting study of the process of transforming inputs into outputs in each industry. We have chosen a compromise method to get at transaction services within firms. We divide occupations into those that provide primarily transaction services to the firm and, by elimination, those that provide primarily transformation services. (Detailed descriptions of the occupational breakdowns are provided in sec. 3.2.) The wages of employees in these "transaction occupations" constitute our measure of the transaction sector within firms.

Let us summarize our approach to estimating the transaction sector within firms. First, we identify occupations that are primarily concerned with transaction functions. These include occupations concerned with the purchase of inputs, the distribution of outputs, and the coordination and monitoring of the transformation function within the firm. Second, we estimate the wage payments going to employees in transaction occupations. Those wage payments constitute our measure of the size of the transaction sector within firms. Therefore, our measure includes only labor costs.

A specific type of firm, intermediaries, poses a special problem and therefore receives a different treatment. Intermediaries could be regarded in the same way as other firms, but they are primarily providers of transaction services. Go back to the house example for a moment. When the seller pays the real estate agent, everything the seller pays is part of the transaction costs of selling the house. *All* of the real estate fee should be included in the transaction sector. This is true even though the realtor in turn hires the transformation services of inputs (like buildings and janitors) that are used to produce the transaction service sold by the realtor to the seller of the house.

We want to treat all of the resources—that is, the total value of the inputs used by intermediaries—as a part of the transaction sector. The problem, of course, is to determine which firms (industries) are properly classified as intermediaries, or what we call "transaction industries." Three cases that seem clear are real estate and finance, whose role is primarily to facilitate the transfer of ownership; banking and insurance, whose role is to intermediate in the exchange of contingent claims; and the legal profession, whose primary role is to facilitate the coordination, enactment, and monitoring of contracts.

Wholesale trade, retail trade, and transportation present a more complicated case. Merchants often do more than transfer ownership of goods between parties, since they take ownership of the goods and transform the product in different ways. Perhaps the most important transformation is transporting the good from the producer to the consumer. The question is whether or not we wish to consider transportation costs as part of the transaction services provided by merchants. Our treatment of the transportation industry will also depend on the answer to this question.

To think about the problem, consider a living room couch purchased from a store that can be delivered to your home or picked up at the store. Should the freight charges of home delivery be considered part of transaction services or not? The answer is no. To show this it is necessary to make very clear the definition of the good in question. Specifically, are we talking about the exchange of a couch in the store or about the exchange of a couch in the living room?

In the case of the couch in the store the producer incurs no delivery charges, but are the resources used by the buyer to get the couch home a transaction cost? No. Resources expended by the buyer to get the couch home are not transferred to the producer, but what is the producer selling? He is selling a couch in the store, and that is what is being purchased. The transportation is, in this case, "home-produced" transformation services.[8]

Now consider the couch delivered by the producer to the living room. Are the costs of delivering the couch transaction costs? No. The producer is now selling a "couch in the living room." He would have had to transport the couch to the living room even had he sold the couch to himself (if it was his own living room). The transportation costs are not transaction costs but transformation costs: the act of moving the couch "transforms" it. When the couch is bought in the store and carted home by the customer the transportation services are home produced; when the couch is delivered the transportation services are market produced. In neither case, however, should the transportation costs be included in the transaction sector.

The implications are that the transportation industry should not be considered as a transaction industry. The wholesale and retail trade industries engage chiefly in transaction activities but also undertake some transformation activities. In the section that follows we include in the transaction sector the resources used in Finance, Insurance, and Real Estate (hereafter FIRE), Wholesale Trade, and Retail Trade; these are transaction industries.[9]

Before going to the empirical sections there are two problems that our definition of transaction cost leaves dangling: the protection of property rights and the "newly painted" house problem. That the protection of property rights is a problem may seem strange, since we often think of transaction costs as the costs of exchanging and *enforcing* property rights. If I enter into a contract with you, and you subsequently fail to fulfill the contract, I can get a lawyer and have you prosecuted. All of those costs that would be part of monitoring the contract and legitimate are transaction costs.

But consider the following problem. You are stranded on a deserted island and build a house. There is a door to the house which keeps the local animals out. An intelligent monkey figures out how to open the door and, in retaliation, you put a lock on the door. Is the cost of the lock a transaction cost? You are enforcing your property rights in your house, but there has not been any exchange, no transaction. Now move the house into the middle of Manhattan. Is the door lock a transaction cost? Does it matter whether it is a man or a monkey breaking into your house?

Frankly we do not know the answer, but feel uncomfortable putting what we might call "protective services" into the nontransaction sec-

tor. As a result we have included police, guards, sheriffs, and the like in the transaction sector, but will at the appropriate time indicate what the magnitude of their contribution is.

The second problem is the "newly painted house." We stated that the cost of painting the house should not be included in transaction costs, since what is being exchanged is now a newly painted house (see note 6). But the example does serve to illustrate a source of transaction costs, one emphasized by both Williamson (cheating) and Barzel (measurement). The owner may paint the house in order to make it more difficult for the prospective buyer to ascertain the quality of the house. Obviously, the owner believes that the obfuscation will result in an increase in the selling price of the house, but now the buyer incurs higher transaction costs, since it is more costly to measure the true condition of the building. Note that those individuals are acting rationally, but the result is to increase transaction costs and thereby reduce net social welfare.

To summarize, we are concerned with measuring the costs of making exchanges, of transaction costs, in the economy. Given the limitations placed on our ability to observe the elements of transaction costs as delineated by our definition, we are only able to measure "transaction services." Transaction services are that part of transaction costs that result in a market exchange. In order to measure the level of transaction services we focus on two basic types of measures, to be explained in detail in the next section. First, we include all of the resources used in providing transaction services in the open market. To do this we have classified certain types of economic activity as "transaction industries." These encompass the normal NIPA categories of Finance, Insurance, and Real Estate; Wholesale Trade; and Retail Trade. Transportation is not considered as a transaction industry (government is considered separately in the third section of the paper). Our second measure of transaction services includes transaction costs that occur within firms in nontransaction industries. To do this we divide occupations into those that provide primarily transaction services and those that provide primarily transformation services. We estimate the wages of employees in transaction occupations and use that as our measure of the transaction services provided by those workers and as an estimate of the size of the transaction sector in the nontransaction industries.

Because we focus on transaction services rather than transaction costs, our measure should not be interpreted as an estimate of the level of transaction costs within the economy, any more than GNP numbers should be taken as a direct measure of well-being. We wish to highlight how the attempt to capture the benefits of specialization and division of labor has changed the organization of economic activity in the United States over the last century. Remember that none of our transaction services are unproductive. They all represent the resource costs of

making exchanges which, on net, made the parties to those exchanges better off (even when transaction costs are included). As such, our estimates form a starting point for a deeper investigation of the nature of economic organization, economic growth, and economic change.

3.2 The Private Transaction Sector

Our fundamental objective in this essay is to measure the changing size of the transaction sector in the American economy. This section measures the transaction sector in the private economy, following the general definition of transaction costs laid out in the previous section. The section has two parts. The first examines the nontransaction industries and the second the transaction industries.

3.2.1 The Nontransaction Industries

The *nontransaction* industries are those that produce primarily nontransaction goods and services.[10] Firms in these industries do engage in exchange, however. Purchasing inputs, coordinating and monitoring factors of production, and selling outputs all involve transaction costs. Disentangling *all* of the resources devoted to transacting from those devoted to transformation is, at this point, beyond our abilities. We focus only on the labor costs associated with the transaction sector.

The first step is to divide occupations into transaction and nontransaction occupations following the guidelines laid down in section 3.1. The share of transaction workers in all workers is determined for each industry. That share is used to divide the total wage bill in each industry between transaction workers and other workers. Compensation of the transaction occupations is then summed across all nontransaction industries. This sum is the measure used to estimate the size of the transaction sector in the nontransaction industries.

Our ability to separate transaction from nontransaction occupations is constrained by the available structure of occupational classifications. The census definitions were not designed to illuminate the distinction between transaction and transformation workers. In most cases, though, the classification of occupations is straightforward. Those are occupations primarily concerned with purchasing inputs or distributing output, that is, the purchasing and sales parts of the firm. Two other groups were easy to classify: the professional workers concerned with processing information and making exchanges, such as accountants, lawyers, judges, and notaries, and the protective service workers concerned with protecting property rights, such as police, guards, watchmen, and others. Two other groups are more difficult. Both involve the transactions that occur within the firm. One group consists of those employees who coordinate and monitor the complex of long-

term contracts (relational contracts in Williamson's terms) that make up a firm: the owners, managers, proprietors, supervisors, foremen, and inspectors. It is, of course, the activity of these employees (and self-employed) who distinguish the firm from the market. As Coase observed:

> Outside the firm, price movements direct production, which is co-ordinated through a series of exchange transactions on the market, . . . Within a firm, these market transactions are eliminated and in place of the complicated market structure with exchange transactions is substituted the entrepreneur co-ordinator, who directs production. It is clear that these are alternative means of coordinating production. (1937, p. 388)

Within the firm that coordination is accomplished by a variety of "managers," from the owner himself down to the inspector or foreman.

The work of the managers and foremen requires a well-developed support network, whose primary purpose is to supply information to the managers. This group of occupations encompasses the clerical occupations. A detailed list of the census occupations that make up the transaction occupations is given in the Appendix.

A general picture of the importance of these occupations in this century is presented in table 3.1. For expositional convenience we call the transaction occupations "type I" occupations. As the table indicates, these workers have grown considerably in importance since the turn of the century, expanding from 15% to 38% of the labor force. Although all the occupations have grown, numerically the most important is the clerical group, followed closely by managers and salesworkers.

Our method of calculating the size of the transaction sector in the nontransaction industries is first to find the share of type I workers in total employment for each industry. Using that share, we then divide wage payments in each industry between type I and other workers. The summation of type I employee compensation across industries constitutes our measure of the transaction sector in the nontransaction industries. Type I employment in each industry is available after 1910 in existing census data. Before 1910, however, employment by industry must be inferred from the occupational data similar to those underlying table 3.1.

Table 3.2 presents information on type I occupations as a percentage of employment, by industry, for 1910–70. As is to be expected, the share of type I employment in total employment grows steadily from 1910 to 1970, just as it does in table 3.1 (differences between tables 3.2 and 3.1 are owing to the detailed occupational breakdowns used in table 3.2). Type I employment roughly doubles its share of total em-

Table 3.1 **Employees in Transaction-related Occupations "Type I Workers," 1900–1970 (Thousands of Employees)**

Occupation	1970	1960	1950	1940	1930	1920	1910	1900
Accountants	712	477	390	238	192	118	39	23
Lawyers & judges	273	213	184	182	161	123	115	108
Personnel & labor relations[a]	296	99	53					
Farm managers[b]	94	50	53	55	68	93	50	17
Managers	6,463	5,489	5,155	3,770	3,614	2,803	2,462	1,697
Clerical	14,208	9,617	7,232	4,982	4,336	3,385	1,987	877
Salesworkers	5,625	4,801	4,133	3,450	3,059	2,058	1,755	1,307
Foremen	1,617	1,199	867	585	551	485	318	162
Inspectors[c]	201	169	144	116	100	93	68	30
Guards & police[d]	747	543	478	397	317	228	162	121
Total	30,236	22,657	18,689	13,775	12,398	9,386	6,956	4,342
Total as % of all workers	38%	33%	32%	27%	25%	22%	19%	15%

Source: United States Department of Commerce 1975, pp. 140–145.

[a]Personnel and labor relations workers were not counted separately prior to 1950.

[b]Includes farm foremen.

[c]Includes surveyors and timber inspectors.

[d]Includes government police, private police, marshalls, and sheriffs.

Table 3.2 **Employment in Transaction-related Occupations as a Percentage of Total Employment, by Industry, 1910–70**

Occupation	1970	1960	1950	1940	1930	1910
All employment						
With military[a]	37.29%	32.45%	30.98%	28.13%	26.02%	17.45%
Without military	38.78	33.72	31.77	28.27	26.35	17.49
Nontransaction Industries						
Agriculture, forestry, & fisheries	3.75	1.92	5.05	0.65	2.05	0.51
Mining	25.40	21.03	10.81	11.80	8.79	5.95
Construction	20.32	17.72	15.72	11.48	9.45	1.41
Manufacturing	30.22	27.88	24.30	22.22	19.27	12.53
Transportation, communications, & utilities	37.62	37.43	33.63	36.44	32.46	28.29
Services	28.09	23.09	19.78	12.46	12.70	5.40
Government						
With military[b]	28.53	26.17	30.11	42.90	36.69	37.92
Without military	38.53	37.46	42.88	46.40	38.71	40.38
NEC[c]	—	2.62	14.14	29.56	24.00	—
Transaction Industries						
Retail trade	57.54	59.85	64.12	65.21	85.74	86.41
Wholesale trade	63.59	67.06				
FIRE	92.02	88.51	84.34	83.04	93.69	98.94

Source: Census reports on occupations are from 1910, 1930, 1940, 1950, 1960, and 1970. See Appendix for details.

[a]The first row includes personnel on active military duty in the labor force; the second row uses civilian labor force.

[b]The first row includes personnel on active duty, and the second row excludes them from government employment.

[c]Not elsewhere classified.

ployment, but as the table indicates, the growth in type I employment varies widely across industries. The transaction industries, Trade and FIRE, have high levels of type I employment declining slightly over time. Type I employment in the nontransaction industries grows significantly. Over 60% of the increase in type I workers in the whole economy between 1910 and 1970 (from 17% to 39%) is accounted for by increases in type I workers in nontransaction industries, particularly increases in manufacturing and services.[11] The primary source of growth in transaction occupations was the nontransaction industries.

It is more difficult to determine occupational employment by industry before 1910. The census did not collect information on employment by industry, only on employment by occupation. Based on the work of Edwards (1943), the occupational distribution of employment by in-

dustry in 1910 and 1930 has been used to estimate employment by industry for earlier census years from available information on employment by occupation. Since employment by industry before 1910 is derived from employment-by-occupation data, estimates of employment by industry required to calculate type I employment shares before 1910 are essentially transformations of the employment-by-occupation data. Therefore the employment by industry and occupation by industry are not independent estimates. Fortunately, with the exception of clerical workers, type I employees can be allocated among industries with some confidence before 1910.

The problem, here as in other studies, is determining the level of total employment by industry.[12] Table 3.3 uses Carson's employment by industry to calculate the share of type I employment by industry for the period 1870–1910 (Carson 1949). Carson's estimates of employment in trade are notoriously low, as is shown in the table, where over 100% of the employees in trade have type I occupations.[13] Differences in the type I shares for 1910 in tables 3.2 and 3.3 result from the use of Edwards's occupation-by-industry classifications in 3.3 and our use of the complete detailed census classifications in 3.2 (see the appendix). Those caveats aside, the two tables tell a fairly consistent tale: type I employment is high and stable in trade and government;

Table 3.3 **Employment in Transaction-Related Occupations as a Percentage of Total Employment, by Industry, 1870–1910**

Occupation	1910	1900	1890	1880	1870
All Employment	18.93%	16.43%	13.70%	11.09%	9.63%
	Nontransaction Industries				
Agriculture, forestries, & fisheries	0.56	0.53	0.52	0.45	0.43
Mining,	5.78	5.08	5.36	3.14	2.81
manufacturing & construction	9.79	6.46	4.89	3.70	3.54
Transportation, communications, & utilities	27.93	21.87	19.36	16.81	13.31
Services	10.04	8.81	8.00	7.54	6.62
Government, NEC	31.26	33.01	27.28	24.19	21.32
	Transaction Industries				
Trade & FIRE	106.86 (78.00)[a]	114.08 (79.37)	106.99 (71.86)	110.90 (69.99)	104.95 (66.34)

Source: Edwards (1943) and Carson (1949). See Appendix for details.

[a]Figures in parentheses use Lebergott's estimates of trade employment to calculate the type I employment share. Lebergott's figures are not as detailed as Carson's, and using Lebergott's estimates for manufacturing, agriculture, and mining does not significantly alter our estimates. Lebergott (1964), p. 510.

low and stable in agriculture; and low and rising in mining, construction, manufacturing, and transportation.

The next step is to convert these employment shares into actual dollar values of resources used as inputs in each industry. Because of the break in employment series and the availability of appropriate national income data, the calculation is done first for the years after 1930, then for years 1900–1940, and finally for the years 1870–1900. The method of estimating the compensation of these employees in each of the periods follows the same procedure, described in detail in the appendix. Briefly, an estimate of employee compensation by industry (for all employees) was taken directly or derived from existing series on compensation, wages, employment, and other data.[14] The employee compensation series was then multiplied by the share of type I employment in total employment, from tables 3.3 or 3.4, to yield an estimate of type I employee compensation by industry. The type I compensation figures were summed over all nontransaction industries; that total was divided by GNP. The results of these calculations are found in table 3.4.

Both the data and the methods used to generate the estimates can be improved upon. However, it is not likely that such improvements would change the basic message of the table: compensation of transactions employees in nontransaction industries rose continuously from the mid-nineteenth century up until the present time. The share of national income/GNP going to type I employees in nontransaction industries rose from 1.4% in 1870 to 10% in 1970. If we were to treat government as a nontransaction industry (a subject that will be dealt with in more detail in the following section), the income share of type I employees in nontransaction industries would reach 14% in 1970, from 1.5% in 1870.

Limitations of the data and our method of estimating the share of resources going to these workers create several potential biases in our estimates. First, the number of workers in type I occupations may have been undercounted in the early census years. This seems to be the case with clerical workers, particularly in the 1870 census. This gives an upward bias to the trend in the share of type I workers. A similar bias could result from the classification of multiple-occupation employees. For example, a firm with 10 employees may employ one person half-time as a foreman and half-time as, say, a carpenter, yet he may report his principal occupation as carpenter. When employment grows to 20 workers, he becomes a foreman full time, and the apparent share of type I employees goes from zero to 5%, while the true share has remained constant.

These two biases are partially offset by other biases. First, we have included number of owners, managers, and proprietors in our type I employees (although not their earnings). These workers are like the

Table 3.4 **Percentage of National Income/GNP Going to Type I Employees in Nontransaction Industries, 1870–1970**

Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1870	2.16	(2.37)								
1880	2.50	(2.74)								
1890	4.18	(4.66)								
1900	4.70	(4.98)	3.32	(4.62)						
1910			4.30	(5.49)	4.32	(5.87)				
1920					7.25	(8.85)				
1930					6.84	(9.20)	6.03	(8.12)	6.21	(8.35)
1940					6.50	(9.23)	6.23	(8.85)	6.67	(10.43)
1950									7.98	(10.45)
1960									9.52	(12.25)
1970									10.40	(14.11)

Source: See Appendix. Nontransaction industries are agriculture, forestry and fishing, mining, construction, manufacturing, transportation, communications and utilities, services, and (government). For a description of calculations, see Appendix, section 2. Figures in parentheses, columns (2), (4), (6), (8), and (10) include government as a nontransaction industry. Columns (1), (3), (5), (7), and (9) exclude government. In brief:

Column 1: Calculated from Gallman (1966) value-added series, using Edwards (1943) 1870–1910 type I employment shares, and Gallman GNP.

Column 2: Column 1 + type I employee compensation in government.

Column 3: Calculated from Lebergott (1964) wage payment series, using Edwards (1943) type I employment shares, and Kuznets's (1961) GNP.

Column 4: Column 3 + type I employee compensation in government.

Column 5: Calculated using Lebergott (1964) wage payment series, 1910–1970 Census Type I employment shares, and Kuznets's (1961) GNP.

Column 6: Column 3 + type I employee compensation in government.

Columns 7 & 8: Same as column 5 and column 6 using NIPA (United States Department of Commerce 1981), GNP.

Column 9: Calculated using NIPA employment compensation series, 1910–1970 census type I employment shares, and NIPA GNP.

Column 10: Column 7 + type 1 employee compensation in government. For details on all calculations, see Appendix.

foreman in the example, only their bias runs the other way. A larger share of the labor force was self-employed in earlier years, and over time these workers have probably increased the share of their labor time spent on managing and decreased time in actual production. Second, in calculating the type I shares for the years before 1910, we built an upward bias into the estimates for the early years. For several categories of type I employment, separate numbers were not reported before 1910. To estimate them we used the 1910 share of specific type I occupations in an industry to approximate that occupation's share of industry employment back to 1870. Since the overall share of type I workers falls as we go back in time, we overmeasure the share of type I workers in those industries where we inferred their employment share in this manner.[15] Finally, the problem with multiple-occupation employees, while potentially important, is also a symmetric bias. That is, the number of multiple-occupation employees who initially report their occupations as type I rather than their other occupation may be as large as the number of multiple-occupation employees who initially report the non–type I occupation (in the example, the man could have reported himself as a foreman initially). There is, of course, no way to know, even roughly, how large these biases are or the extent to which they cancel each other out.

Our other major concern is with the method of generating the estimates. First, we have ignored the capital resources associated with these workers. It is possible that type I workers worked with larger (smaller) amounts of capital goods in early years than they did in later years, in which case our trend in resources used by type I workers is biased upward (downward). Second, our measures operate on a highly aggregated level. They could be improved by using wage, hour, and employment data for specific occupations within industries. Finally, our margins of error in calculating the amount of resources used by type I workers in nontransaction industries must be multiplied by the margins of error inherent in the estimates of GNP used to calculate the share of resources used by these workers. The confidence intervals on the estimates in table 3.4 are therefore quite large. On the other hand, there is no compelling reason to believe that biases or errors in the estimates are systematic enough to obliterate the strong upward trend in the resource share going to type I workers.

3.1.2 The Transaction Industries

We turn now to the second set of estimates, the resources used by the transaction industries: trade and FIRE. We want to estimate *all* of the resources used in the transaction industries. We assume, for the moment, that all inputs into trade and FIRE go to transaction services.[16] Such a measure does not correspond to the measures of industry out-

put, value added, or income originating that we usually use to characterize the contributions of an industry to GNP. We are concerned only with the value of resources that transaction industries use. We do not attempt to impute anything about the value of the services they provide to the economy, and we do not face the standard problem of double counting that necessitates careful attention to net and gross distinctions in the standard income accounts.

Table 3.5 reports our estimates of total resources used by trade for the period 1869–1970. Before 1948 we utilized Barger's estimates of gross distribution markups to estimate the total resources used in trade. We took measures of final commodity output from Gallman and Kuznets, multiplied by Barger's estimates of the total share of commodity output going through retail distribution channels, and multiplied again by Barger's estimates of gross distributive markup. After 1950 we took estimates of resources used in trade directly from the input/output tables used by the Commerce Department to estimate GNP.[17]

As the table indicates, resources used in trade grew from 16% of GNP in 1869 to 22% in 1948, falling to 18% in 1972. While this estimate could be improved by combining a more detailed breakdown of commodity output with Barger's detailed estimates of distributive markup by type of store, there is no reason to suppose that the table would be greatly affected by that adjustment.

Estimating the amount of resources used in the other transaction industry, FIRE, is more difficult. Earlier attempts to estimate GNP

Table 3.5 **Resources Used in Trade, in Billions of $ and as Percentage of GNP, 1865–1972**

Year	Billions of $ (1)	Percentage of GNP (2)
1870 (1869)[a]	1.27	16.14
1880 (1879)	1.72	18.02
1890 (1889)	2.22	18.07
1900 (1899)	3.10	19.15
1910 (1909)	5.64	19.07
1920 (1919)	13.74	19.57
1930 (1929)	16.45	18.74
1940 (1939)	18.09	20.54
1950 (1948)	52.25	21.87
1960 (1958)	92.3	21.18
1970 (1972)	216.4	18.25

Sources:
Column 1: 1870–1950: table 3.A.5, col. 4.
1960–70: table 3.A.4, col. 3.
Column 2: table 3.A.4, col. 6.

[a]The years in parentheses are the years for which calculations were actually made.

have finessed the financial sector by imputing some value to its output or calculated it as a residual category.[18] Our method, therefore, is quite simple. From 1958 to 1972 we base our estimate of gross resources used in FIRE on the Commerce Department input/output tables.[19] The estimates were extended back to 1920 using NIPA and Kuznets's data on national income in FIRE as an index. From 1870 to 1900 we used Gallman and Weiss's estimate of value of total output in banking and insurance.[20] The results of the estimates are presented in table 3.6.

Taken together, tables 3.4, 3.5, and 3.6 make up our estimate of the transaction sector in the private portion of the economy. The private transaction sector rises from roughly 18% of GNP in 1870 to 41% of GNP in 1970. The 1870 figures are probably too high; the share of resources going to FIRE and the share of type I employee compensation in nontransaction industries are overstated. The 1930–70 figures are based on solid data and can be taken with some confidence. The strong upward trend in the transaction sector share of GNP is, if anything, biased downward. The reasons underlying this trend will be discussed in section 3.4, but first we turn our attention to the public sphere.

3.3 The Public Transaction Sector

In this section we examine the provision of transaction services by governments. In a fundamental sense our broad conception of transaction services would include all of government in the transaction sec-

Table 3.6 **Resources Used in Finance, Insurance, and Real Estate, in Billions of Dollars and as a Percentage of GNP, 1870–1970**

Year	Billions of $ (1)	Percentage of GNP (2)
1870 (1869)[a]	.310	4.19
1880 (1879)	.453	4.75
1890 (1889)	.845	6.87
1900 (1899)	1.29	7.96
1910	—	8.12
1920	5.5	8.28
1930	9.5	12.61
1940	9.6	9.88
1950	23.1	10.45
1960 (1958)	55.7	10.61
1970 (1972)	120.8	12.15

Sources:
Column 1: table 3.A.8, col. 1 + 2.
Column 2: table 3.A.8, col. 5.
Note that 1930 values are the average of the two 1930 values in table 3.A.8.
[a]Years in parentheses are years for which calculation was actually made.

tor. A function of "governing" is to provide the sociopolitical assets that underlie all economic activity; that is, government incurs the social overhead costs that enable specialization and division of labor to occur. In our more limited definition of transaction costs, however, only a range of government services is properly considered transaction services. Particularly important are the costs of enforcing contracts (the court and police systems) and the costs of protecting property rights on a larger scale (national defense).

A second group of government activities is more difficult to classify. It includes education, transportation facilities, and basic public services such as fire protection, hospitals, health services, public sanitation, and housing. These activities all have an element of social overhead capital; they are part of the cost of maintaining our existing social order. Maintaining that order is, of course, a prerequisite for specialization and division of labor.

Finally, a third group of government activities has little to do with transaction services, particularly income redistribution. These activities are not, however, completely unimportant to the size of the transaction sector. Just as the nontransaction industries in the private economy utilize transaction services, so too the government requires the use of transaction services in order to carry out its nontransaction activities. In this section we discuss each of these three types of government activity and develop a method to estimate the transaction sector in each that follows closely the method used to estimate the size of the transaction sector in the private economy.

Table 3.7 breaks down government expenditures for activities that correspond to the three categories. Table 3.8 presents expenditures for each category as a share of GNP for selected years in this century. As the table indicates, each expenditure category has tended to grow consistently over this century.

The first category of expenditures includes basic expenditures to secure property rights and facilitate trade. By far the largest single item in this category is defense.[21] A breakdown of transaction service expenditures into components is shown in table 3.9. Including police and general government in the transaction sector seems straightforward. There are, however, legitimate reasons to question whether all of the defense budget should be included in transaction service expenditures. The rise of the "military-industrial complex" may give rise to some defense expenditures, like cost overruns, that should fall under transfer payments. Increases in defense spending since World War II are associated with a larger United States role in international affairs, and can be considered as political/diplomatic expenditures rather than as defense. Finally, defense expenditures fluctuate from year to year and administration to administration, and there is no way to measure the

Table 3.7 Classification of Expenditures by Type

Transaction services
National defense, military + foreign relations + veterans
Postal service
Police
Air transportation
Water transportation
Financial administration + general control
Social overhead
Education
Highways
Hospitals
Health
Fire
Sanitation
Natural resources
Housing and urban renewal
Other
Public welfare
Farm price supports
Social insurance administration
Insurance trust expenditures
OASDI
Unemployment compensation
Employee retirement
Space research
Local parks
Interest on general debt
Utility and liquor stores
Other and unallocable

effect of those expenditures on our level of security, nor is opinion by any means unanimous that higher defense expenditures are related positively to higher levels of national security.

These questions arise because it is unclear exactly what the government buys when it spends money for defense. Beyond doubt, however, these expenditures are the expenses of maintaining national security, given our current political and social arrangements. Rather than attempting to divide defense spending into defense and nondefense activities, we treat it all uniformly and present two alternate measures below. One gives less weight to defense expenditures in the transaction sector.

The second category of expenditures poses a more difficult problem of classification. Expenditures by major component of expenditure are given in table 3.10. Individual components were included in this category for the following reasons. Education involves an element of transaction services to the extent that education (1) informs individuals

Table 3.8 **Government Expenditures by Type as a Percentage of GNP, 1902–70**

Year	Transaction Services (1)	Social Overhead (2)	Other (3)	Total (4)
1902	2.8	2.8	1.6	6.9
1913	2.8	3.3	2.0	8.0
1922	3.9	5.2	3.7	12.6
1927	3.1	5.4	3.3	11.7
1932	6.2	9.4	6.4	21.4
1938	4.5	9.2	9.3	20.9
1942	19.1	4.9	5.9	28.9
1948	9.5	6.1	6.5	21.5
1952	16.7	6.5	6.4	28.9
1957	13.5	7.5	8.0	28.4
1962	12.8	8.7	11.3	31.5
1967	12.4	9.7	11.4	32.7
1970	11.3	10.3	12.1	33.5

Sources: GNP figures are from Department of Commerce, *Historical Statistics of Government, Finance and Employment* (Washington, D.C.: Government Printing Office, 1969), p. i.

1902–1967, United States Department of Commerce (1969), table 3.

1970, United States Department of Commerce (1984), p. 274; GNP data from p. 420.

Table 3.9 **Government Expenditures on Transaction Services, by Component, as a Percentage of GNP, 1902–70**

Year	Military (1)	Police (2)	General Governing (3)
1902	1.26	0.21	1.33
1913	1.06	0.23	1.53
1922	1.86	0.28	1.75
1927	1.24	0.30	1.55
1932	2.84	0.60	2.75
1938	1.93	0.45	2.09
1942	17.12	0.28	1.64
1948	7.79	0.28	1.40
1952	14.69	0.42	1.59
1957	11.50	0.49	1.54
1962	10.60	0.57	1.74
1967	10.01	0.57	1.77
1970	9.05	0.49	1.81

Source: See table 3.8.

Column 1: Military = (military + foreign + veterans)

Column 2: Police = (police + corrections)

Column 3: General governing = (general government + financial control + postal)

Table 3.10 **Government Social Overhead Expenditures, by Component, as a Percentage of GNP, 1902–70**

Year	Education (1)	Highways (2)	Urban Services (3)
1902	1.07	0.72	0.64
1913	1.44	1.04	0.71
1922	2.31	1.75	0.95
1927	2.33	1.89	0.98
1932	4.01	3.04	1.75
1938	3.13	2.54	1.47
1942	1.71	1.12	1.14
1948	3.01	1.20	1.27
1952	2.78	1.36	1.64
1957	3.42	1.80	1.59
1962	4.07	1.88	1.95
1967	5.09	1.78	2.01
1970	5.62	1.68	2.24

Source: See notes to table 3.8.

Column 3: Urban services = fire + water + sanitation + hospitals + housing + urban renewal (see table 3.7).

about the existing legal and social arrangements regarding exchange; (2) reinforces the socialization process regarding the legitimization of contracts, which lowers the costs of enforcing contracts to the extent that people do not engage in "strategic behavior" or arrangements regarding exchange; and (3) directly reduces the costs of dealing with different social, ethnic, and cultural groups within society by providing all individuals with a common language, history, and cultural values.

The transportation services provided by government (highways, air, and water terminals) fall between transaction and transformation services. As discussed in the first part of the paper, we do not wish to treat transportation costs as a part of the transaction sector. Accordingly, publicly provided transportation services should not be included there. However, the part these services play in determining the level of transportation costs within the economy is crucial in determining the degree of specialization and division of labor, and therefore the level of transaction costs in the economy. It is for this reason that we include them here, even though we do not include government expenditures on transportation facilities in the transaction sector in what follows.

The third group of government-provided social overhead services can be lumped together under the title "urban services." Urban services indirectly lower transaction costs by making urban living less costly. A major advantage of living in an urban area is the reduction

in transaction costs associated with having a large number of buyers and sellers in close proximity. Public provision of urban services directly reduces the cost of living in urban areas, increasing the number of individuals who can profitably move to cities and capture the gains from specialization and division of labor at lower transaction costs than they could in rural areas.

Even those who completely agree with our characterization of these functions will admit, as we do, that any partition of expenditures on education, transportation facilities, and urban services into transaction and nontransaction components is arbitrary. Therefore we have chosen not to go any farther than table 3.10. We do not include expenditures on these functions in our measure of public transaction services, but note that some portion of these expenditures would be included if we had a better understanding of the nature of government activity and its relationship to the economy.

Despite our exclusion of social overhead and other expenditures from the transaction sector, it is necessary to include the transaction services involved in administering those programs in our measure of the public transaction sector. Just as there are transaction services involved in the production and distribution of goods in the nontransaction industries, so there are transaction services involved in the production and distribution of government-provided goods and services.

Table 3.11 **Government Expenditures for Transaction Services and Compensation of Employees in Transaction-Related Occupations in Social Overhead and Transfer Programs, as a Percentage of GNP, 1902–70**

	Government Expenditures on Transaction Services (1)	Compensation of Employees in Transaction-Related Occupations in Other Government Programs (2)	Total (3)
1900 (1902)[a]	2.8	.87	3.67
1910 (1913)	2.8	.86	3.66
1920 (1922)	3.9	.97	4.87
1930 (1932)	6.2	1.97	8.17
1940	4.04	2.56	6.60
1950	9.24	1.71	10.95
1960	12.18	1.86	14.04
1970	11.3	2.60	13.90

Sources: Column 1: Table 3.8, col. 1.

Column 2: Table 3.A.9, col. 4.

[a]Years in parentheses refer to year for which calculation was actually made.

We employ the same technique to estimate this part of the public transaction sector as was used earlier to estimate the transaction sector in nontransaction industries. We multiply the share of employment in transaction occupations (type I employees) in all government employment by employee compensation in nontransaction government functions to obtain our estimate of the transaction sector in the nontransaction part of government. To that we then add the value of all resources, labor and capital, used in producing transaction services by the government. Our estimates using this method appear in table 3.11, where transaction expenditures as a share of GNP are reported separately from type I employee compensation in nontransaction expenditures. As the table indicates, the measure rises from 3.67% of GNP in 1902 to 13.90% of GNP in 1970. The importance of transaction services fluctuates somewhat, because of the influence of war expenditures. Employee compensation of transaction occupations in other government functions as a percentage of GNP grows fairly steadily throughout the period.

A second method is less complete in its coverage, but it avoids the problem of classifying defense expenditures and provides a minimum estimate of the transaction sector in government. The method simply treats all government as a nontransaction industry. Table 3.12 presents the results of the alternative estimates. Type I employee compensation as a percentage of GNP was derived by combining type I employment in government, table 3.2, with compensation of civilian government employees. To that is added compensation of military employees, em-

Table 3.12 **Compensation of Transaction-Related Employees in Government, as Percentage of GNP, 1900–1970**

Year	Percent GNP Type I Employees (1)	Percent GNP Military Employees (2)	Total (3)
1900 (1902)[a]	1.30	0.41	1.71
1910 (1913)	1.55	0.38	1.93
1920 (1922)	1.60	0.47	2.07
1930 (1932)	2.14	0.48	2.62
1940	3.76	1.07	4.83
1950	2.47	1.86	4.33
1960	2.73	1.32	4.05
1970	3.71	2.15	5.86

Sources: Column 1: Table 3.4.

Column 2: Table 3.A.10, col. 4.

Column 3: (1) + (2)

[a]Years in parentheses are years for which calculations were actually made.

ployees excluded from transaction-related employees in our treatment of the census occupation data. The table follows the same trend as table 3.11, although, as expected, the share of GNP is lower. Taken as a minimum estimate of the transaction sector in government, it rises from 1.71% of GNP in 1900 to 5.86% of GNP in 1970.

Extending the estimates back into the nineteenth century is difficult. There are no solid data on state and local expenditures before 1880, and even the census material for 1880 and 1890 are not complete. The work of Davis and Legler (1966) on government activity in the nineteenth century does not suggest that government, as a share of GNP, changed markedly between 1870 and 1900. Given their findings and the lack of detailed data, we have chosen to assume that the public transaction sector from 1870–1900 was identical to its actual size in 1900.

To summarize, we treat the public part of the economy in much the same way as the private part. Government activity is broken into transaction and nontransaction services. All resources used in activities that provide transaction services and employee compensation of transaction occupations in other government activities are included in the transaction sector. As a more conservative alternative we also treat the entire public sector as a nontransaction industry and proceed as we did in section 3.2.

3.4 Interpreting the Data

Before we get too deeply enmeshed in a discussion of why the transaction sector has grown, let us review briefly the magnitude of that growth. Table 3.13 assembles our various estimates of the private and public transaction sector shares of GNP. Keeping in mind that the 1870–90 estimates are probably high, the transaction sector grows from roughly one-quarter of GNP in 1870 to over one-half of GNP in 1970. Even with the qualifications on data and methods discussed in the text and appendix, the amount used in the transaction sector is high and rising.

Economists and economic historians have described fundamental structural changes in the American economy in the past century. These have included the shift from rural to urban living, the shift in the composition of output away from agricultural and extractive industries toward manufacturing, and then, more recently, the growth of services and the growth of government, the changing size of firms from the late nineteenth century on, and the growing sophistication of economic organization. Our interpretation of the role of transaction costs is consistent with these structural shifts, but leads to a different interpretation of the American economy than has been traditionally associated with this evidence.

Economics and theories of economic growth revolve around the gains from trade arising from specialization and division of labor. Productiv-

Table 3.13 The Transaction Sector as a Percentage of GNP

Year	Private (1)	Public I (2)	Public II (3)	Total I (4)	Total II (5)
1870	22.49	3.6[a]	1.7[a]	26.09	24.19
1880	25.27	3.6[a]	1.7[a]	28.87	26.97
1890	29.12	3.6[a]	1.7[a]	32.72	30.82
1900	30.43	3.67	1.71	34.10	32.14
1910	31.51	3.66	1.93	35.17	33.44
1920	35.10	4.87	2.07	39.98	37.17
1930	38.19	8.17	2.62	46.35	40.81
1940	37.09	6.60	4.83	43.69	41.92
1950	40.30	10.95	4.33	51.25	44.63
1960	41.30	14.04	4.05	55.35	45.36
1970	40.80	13.90	5.86	54.71	46.66

Sources: Column 1 is taken from tables 3.4, 3.5, and 3.6. See appendix table 3.A.12.
Column 2: table 3.11.
Column 3: table 3.12.
Column 4 = columns 1 + 2.
Column 5 = columns 1 + 3.
[a]Assumes that the public transportation sector in 1870–90 is approximately the same as 1900.

ity increase comes from increasing the efficiency of the inputs in the transformation process. But such gains are only realized through exchange, and traditionally economic theory has assumed that exchange is costless. Our essential point is that transaction costs are a significant part of the cost of economic activity. One implication of this is that, throughout history, the costs of transacting may have been as much a limiting factor on economic growth as transformation costs. This perspective turns the traditional analysis of economic growth on its head. Until economic organizations developed to lower the costs of exchange we could not reap the advantage of ever greater specialization. Economic history is then the story of the reduction of transaction costs that permit the realization of gains from greater specialization. The development of specialized banking, finance, trade, and other transaction functions are the necessary requirements for enhancing productivity, and so is the role of government in specifying and enforcing a system of property rights. Our argument stresses two points.

First, while competition in the private sector ensures that more efficient organizational forms will replace less efficient ones, no such constraint operates on government (see North 1981). Governments may impede or promote economic growth, but it would be ignoring one of the most important aspects of economic history not to recognize that in all high-income countries government has played an increasingly

important role in the economy, a role that must be sufficiently positive to enable society to realize the enormous production potential of the revolution of science and technology of the past century and a half. That the resources devoted to transacting by governments are (with the ambiguous exception of military expenditure) a relatively small part of the total costs of transacting may mislead us into believing that government has played no significant role. To the contrary, the public resources devoted to the specification and enforcement of property rights has been so efficient that it has made possible the enormous burgeoning of the contracting forms that undergird our modern economy and is the key to explaining the contrast between the high-income countries and Third World countries.

Our second point is that the growth of the transaction sector is a necessary part of realizing the gains from trade. Part of transaction sector growth is simply a shift from nonmarket (and therefore nonobserved) transaction costs to the market (and therefore counted in our transaction sector). But part of the growth constitutes real investment of resources. These resources have to be devoted to the maintenance of the economy's institutional fabric in order to realize the enormous production potential of the revolution in science and technology, which necessarily requires an increase in specialization and therefore a growth in exchange.

In our view, there are three major reasons why transaction costs have risen over the last century. First, the costs of specifying and enforcing contracts became more important with the expansion of the market and growing urbanization in the second half of the nineteenth century. As the economy becomes more specialized and urbanized, more and more exchanges are carried out between individuals who have no long-standing relations, that is, impersonal exchange. In contrast to personal exchange, where repeated dealing and intimate knowledge of the other party reduced the cost of contracting, impersonal exchange required detailed specification of the attributes of what was being exchanged or of the performance of agents, as well as elaborate enforcement mechanisms. This in itself would suggest a radical change in the cost of transacting. The growth of markets and urbanization was dramatically quickened by falling transportation costs after 1850. Consumers were able to purchase goods from wider distances and a greater number of suppliers. An effect of this greater variety is a reduction in the personal contact between buyers and sellers. Rational consumers substitute more search and information-gathering activity (including purchasing information through middlemen, i.e., transaction services) as they come to know less and less about the persons from whom they buy their products. The same holds for sellers who come to service a wider range of buyers.

The second part of our story is the effect of technological change in production and transportation on transaction services. The new capital-intensive production techniques were often more profitable to operate (i.e., lower costs) at high output levels. The high output levels required a steady flow of inputs and a well-developed system of disposing of the product. The complex organizations within firms that arose to purchase inputs and distribute outputs were providing transaction services within the firm. Reduction in costs and increases in the speed of transportation made possible larger business organizations and placed a premium on the coordination of inputs and outputs and monitoring the numerous contracts involved in production and distribution. As in production, new technical advances in transportation placed a premium on transaction services, which led to more of those services being provided within firms and through the market.

The third part of our story is the declining costs of using the political system to restructure property rights. The consequence of this change, the breakdown of the Madisonian system, has been documented already (North 1978). It consisted of changing the cost of using the political system via the development of commissions, which replaced the decision-making unit of entire legislatures and the development of rule-making ability by executive departments of the government. This type of government growth imposed transaction costs on the rest of the economy.

In our view, then, the transaction sector has grown for three major reasons: increasing specialization and division of labor; technological change in production and transportation accompanied by increasing firm size; and the augmented role of government in relationship to the private sector. Of course, this paper presents no conclusive proof that any or all of these three elements is the correct explanation of the growing importance of transaction services within the economy. Satisfactory explanations will await more detailed investigations into the transaction sector itself, and its behavior in different industries and in different periods of time. In lieu of those investigations, however, allow us to suggest some implications of our results for two important and interrelated areas of economic history: the study of economic growth and the measurement of economic activity.

Explaining economic growth is perhaps economic history's central task. Growth is a function of productive technology, the quality of inputs, and the institutional structure of the economy. The study of each of these potential sources of growth has dominated inquiry in different periods of time, but the study of institutional structures and economic growth has not enjoyed the melding of statistical inquiry, theoretical formulation, and historical analysis that technology and human capital have received. For the most part institutions are treated

theoretically as a kind of disembodied economic factor: the rules of the game rather than the actual players.

Institutions, however, are not just rules, they require labor, capital, and other real resources in order to operate. The approach of this paper provides important information on the actual costs of implementing institutional structures. Even if one doubts the trend growth of the transaction sector, it is difficult to ignore the sheer volume of resources that go into supporting the most fundamental economic institution: the market. Systematic identification of certain kinds of activities (like secretaries, clerks, foremen, etc.) with what we believe to be important parts of the institutional structure can provide an empirical wedge into understanding the process of institutional change.

For whatever reason, and the three given at the beginning of this section are prime candidates, most firms found it necessary to devote more resources to coordinating, enacting, and monitoring exchange over the last century. The growing importance of these transaction workers raises a series of questions. Were they essential for competitive success in the marketplace? Did firms that moved early into providing transaction services internally prove to be more successful than those that did not? What would a standard partitioning of factors that explain productivity changes indicate in these industries if the labor input were divided into transaction and transformation workers?

Chandler's *Visible Hand* portrays vividly how managers, clerks, and secretaries become essential elements in the growth of the new large industrial enterprises (Chandler 1977). Their importance was both external and internal to the firm. Controlling the flow of inputs into the production process and distributing outputs was as critical as coordinating the production process within the firm. What we wish to stress about Chandler's observations is that all these managerial activities are essentially transaction services.

This study also raises issues with regard to another central area of economic history: the measurement of economic growth through national income accounting. At the outset we cited Kuznets's observation that no structure of economic accounts is "unaffected by economic theories." The size of the transaction sector documented here suggests that a theoretical structure in which transaction costs are assumed to be zero may be inadequate for measuring changes in economically valuable outputs in a world of pervasive transaction costs. Particularly important is the distinction between final and intermediate goods when the "output" of the transaction industries is being considered, a subject beyond the scope of this study but one of considerable importance when we wish to evaluate the performance of the American economy over time.[22]

A more pedestrian, but equally important, issue is the internal organization of the accounts. With the exception of calculating the em-

ployment shares of transaction-related workers, none of the data used in our study are original. All of it comes directly from the classical works on national income accounting. We have simply repackaged the accounts utilizing a new set of internal divisions, using the transaction and transformation functions as our guide for segregating economic activity rather than the typical industrial divisions.

Recasting the accounts will not change the trend of per capita income over time, but it can change our interpretation of how changes in income come about. The existing internal structure of the accounts was designed to illuminate business cycle movements. The accounts can yield more information about economic growth and the composition of economic activity, but only if we are willing to pose new questions and exploit the rich variety of information built into the accounts by those who first constructed estimates of national income.

This essay has sought to establish one historical series: a measure of the transaction sector in the American economy from 1870 to 1970. Despite reservations one may have about the accuracy of the data or the appropriateness of the estimation methods, the magnitude of the increase in the resources used by the transaction sector over the last century is a phenomenon that must be dealt with. The growth of the transaction sector is the growth of a function necessary to the coordination of the tremendous amount of resources that have been committed to the market over the last hundred years. Transaction *costs* in the aggregate may or may not have risen in the last century, but certainly we can conclude that transaction *services*—the number of people, and the resources they command, who coordinate the flows of inputs into production, monitor the production process itself, and coordinate the flow of goods from producers to consumers—have risen continuously since 1870. The growth of the transaction sector is a structural change of the first order.

The growing size of the transaction sector poses a major explanatory challenge to economists and economic historians. What is the relationship of those inputs to their outputs? How have transaction and transformation costs interacted in the transformation of the economy? What are the implications of the growing sector for a variety of social and institutional changes? These are only a few important questions that should be explored in the context of structural change implied by this study.

Appendix

This appendix describes the construction of the various data series presented in the text. The first section describes the transaction-related

(type I) employment series, taken from various census sources; the second, the estimates of type I employment compensation in nontransaction industries; the third, the trade estimates; the fourth, the finance, insurance, and real estate (FIRE) estimates; the fifth, the public sector estimates; the sixth, GNP estimates; and the last, the combination of the estimates in table 3.13.

1. Type I Employment

The series on type I employment by industry is broken into two parts. The first covers census years from 1910 to 1970, years with available data on occupational employment by industry. The second covers census years from 1870 to 1910.

1910 to 1970

The general classification of type I workers remained consistent over the census years. A listing of type I occupations is followed by detailed notes for each of the census years.

Type I includes:

Managers, owners, and proprietors: including other managers, administrators, dealers (in trade), bankers (in FIRE);

Foremen: including foremen, inspectors, gaugers, weighers, postmasters, and conductors;

Sales workers: including a variety of agents, shipping agents, purchasing agents, insurance and real estate agents; sales clerks, sales workers, newsboys, sales agents, and other sales workers;

Clerical workers: bookkeepers, cashiers, secretaries, stenographers, office machine operators, telephone operators, typists, shipping clerks, receiving clerks, clerks, and other clerical workers;

Table 3.A.1 Division of Clerical Employment by Industry, 1910

Industry	Number of Employees	Employment as Percentage of All Clerical Employment
Agriculture, forestry, and fishing	2,801	0.16
Mining	12,373	0.72
Construction	14,260	0.83
Manufacturing	305,129	17.76
Transportation, communications, and utilities	459,120	27.72
Trade	540,120	31.43
Finance, insurance, and real estate	180,167	10.48
Services	67,214	3.91
Government	137,272	7.99

Source: "Population," *1910 Census of Population*, table 4, pp. 302–433.

Professional workers: accountants, lawyers, judges, notaries, and personnel and labor relations workers;

Protective workers: police, guards, watchmen, marshalls, sheriffs, detectives, and constables.

In all years we exclude farm owners, military personnel, and teachers. In table 3.2 all type I employment shares are calculated using industry employment figures reported in or calculated from the occupational census figures. Although the categories explicitly considered in the census were refined in later census years, the categories are quite comparable from year to year. The major worries are over the number of "other" workers and "not elsewhere classified" workers. The extent to which these workers are type I workers is unknown.

Notes for Specific Years

1970:[23] Includes all workers in the major categories of managers and administrators (excluding farm owners); sales workers; and clerical workers. Also included are lawyers and judges; accountants; foremen; checkers, examiners, and inspectors; guards and watchmen; graders and sorters; and personnel and other labor relations workers.[24]

1960:[25] Includes all workers in the major categories of managers, officials, and proprietors (excluding farm owners); clerical and kindred workers; and sales workers. Also included are accountants and auditors; lawyers and judges; public relations workers;[26] foremen; guards, watchmen, and doorkeepers; checkers, examiners, and inspectors; and graders and sorters.

1950:[27] Includes all workers in major categories: managers, officials, and proprietors (excluding farm owners); clerical and kindred workers; and sales workers. All foremen, inspectors, and police that could be allocated to an industry were. Some occupations could not be allocated to specific industries, including accountants and auditors, lawyers and judges, personnel and labor relations, guards, watchmen and doorkeepers, guards and bridgetenders, and private police and detectives. These constituted 1.86% of the labor force, and were divided among all industries on the basis of each industry's share in total employment.[28]

1940:[29] Includes all workers in major categories: proprietors, managers, and officials (excluding farm owners); clerical, sales, and kindred workers; and protective service workers (excluding soldiers, sailors, marines, and coast guard). Also includes all foremen and inspectors that could be placed in industries. Those foremen, inspectors, lawyers, and judges who could not be placed in an industry were evenly distributed over all industries (they constitute 0.39% of the labor force). Accountants are included, although they are now listed as clerical,

rather than professional workers. Personnel and labor relations disappear as a category altogether.

1930 and 1910: The information in the 1910 and 1930 census volumes is in a different form from that for later years. Employment by occupation is reported for individual industries, and totals are not presented for the major industry groups. Therefore the estimates are built up from individual calculations made for each industry. As a result the occupational classifications are considerably more detailed. We report the major divisions, and will supply a complete listing on request.

1930:[30] A variety of occupations is listed. Occupations reported by the census fall into five major groups.

—Proprietary, official, and supervisory pursuits: We include owners, operators, proprietors, managers, building contractors, foremen and overseers, conductors, postmasters, bankers, brokers, dealers in wholesale and retail trade, and like occupations.

—Professional pursuits: We include only lawyers.

—Clerical and kindred pursuits: We include accountants and auditors, bookkeepers and cashiers, clerks (including sales), shipping clerks, stenographers and typists, agents (purchasing and others), messenger, errand, and office boys and girls, weighers, other clerical pursuits, and like occupations.

—Skilled trades: No type I workers.

—Other pursuits: We include inspectors, scalers, and surveyors, guards and watchmen, and police.

1910:[31] A wide variety of occupations are listed. Basic groups and their constituent elements include:

—Proprietary, officials, and owners: We include owners and proprietors, managers and officials, bosses and foremen, overseers, builders and building contractors, contractors, bankers and bank officials, a variety of dealers in wholesale and retail trade, conductors, and postmasters.

—Clerical and kindred workers: We include agents, clerks, collectors, messengers, errand and office boys, purchasing agents, stenographers and typists, weighers, bookkeepers, cashiers, accountants, collectors, credit men, canvassers, commercial travelers, office appliance operators, telephone operators, advertising agents, and like occupations.

—Other occupations: We include inspectors, guards and watchmen, police, and like occupations.

The 1910 census reports judges, justices, and magistrates; lawyers; and abstractors, notaries, and justices of the peace in professional service rather than in industry categories. We divided lawyers and the like between "Services" and "Public Service" on the basis of their division in 1930.[32]

Government Employees

The estimates of type I employees in government required additional manipulation of the census numbers. First, the census classified some government workers in industries other than public administration or public service. From 1950 to 1970 public education is listed as a minor industry in the service category, and it was a minor matter to shift those workers back into public administration. In 1940, however, education is listed as a single category in the service industry (public and private education are not distinguished), and in 1910 and 1930 education is not identified as a minor industry at all. In 1940 we took 74% of all education employees (the average ratio of public employees to all employees in education in 1950–70) and moved them into public administration (making a corresponding reduction in services). We also assumed that the share of type I employees in education equals the share in the service sector, an assumption roughly accurate for 1950–70.

To break out education in 1910 and 1930 we obtained an estimate of employment in education for those years,[33] assumed that 74% of those people were in public education, and assumed again that the type I share of employment in education equaled the type I share in total services. Our estimated public education workers were added to public government and deleted from the service industry. A similar adjustment was made for postal workers, who were also included in the service industry. Tables 3.2 and 3.A.2 reflect these adjustments.

The second problem regards the classification of government employment in the census. What we have called "government" in table 3.2 when calculating the type I employment shares includes what the census labels "public administration, NEC" (not elsewhere classified). Although we have reclassified the two most important groups of public employees, postal and education workers, there are still some unclassified government workers in other industries. Potentially important are welfare workers in the service industry. We have been unable to establish the number of these "elsewhere classified" workers. Although they are probably few, their reclassification into public administration could potentially affect our estimates of type I employment shares in government used to estimate the size of the public transaction sector.

1870–1910:

The estimates of type I employment that appear in table 3.3 are derived from Edwards's *Comparative Occupation Statistics for the United States, 1870 to 1940*. Edwards has been discussed at length elsewhere, and we will not delve deeply into his methods here.[34]

The figures in table 3.3 are taken from Edwards, with one modification. Edwards reported employment by occupation for each industry.

Table 3.A.2 **Employment by Industry, as Percentage of Total Employment, 1910–70**

Industry	1970	1960	1950	1940	1930	1910
Agriculture, forestry, and fisheries	3.73	6.73	12.44	18.86	22.21	33.26
Mining	.83	1.01	1.65	2.03	2.40	2.78
Construction	6.03	5.90	6.12	4.57	5.32	8.96[a]
Manufacturing	25.86	27.09	25.91	23.52	24.35	19.60[a]
Transportation	6.78	5.51	7.71	6.93	8.58	7.95
Retail trade	15.97	14.82	18.76	16.77	12.26	10.01
Wholesale trade	4.04	3.42				
Finance, insurance, and real estate	5.02	4.17	3.41	3.27	3.29	1.36
Services	20.35	17.04	15.27	16.53	13.82	12.71
Government	11.39	8.88	7.16	5.99	5.28	3.37
Other, NEC	—	5.42	1.50	1.53	2.76	—
Totals	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Occupational Reports of the various censuses between 1910 and 1970. See appendix notes for references.

[a]In 1910, hand trades included in construction; all other years, hand trades included in manufacturing.

We allocated managers, owners, proprietors, and foremen and like occupations to the type I category in each industry. But Edwards did not distribute clerical workers, protective service workers, professional service workers, and distributive occupations (agents, collectors, and the like) between industrial categories, a task we were obliged to carry out.

Examination of the distributive occupations that Edwards assigned to "trade" (an industry encompassing FIRE as well as wholesale and retail trade and enclosed in quotation marks to distinguish it from wholesale and retail trade), revealed that his numbers correspond closely to the numbers in trade and FIRE reported in the census for 1910. Therefore we left all Edwards's "trade" workers in the trade industry. Our figure on type I employment in trade takes all employment reported in Edwards, excluding only delivery men, undertakers, and laborers.

The protective service workers in the private economy (primarily guards and watchmen, with a small number of private police), were classified by Edwards as "public service." We could have distributed these workers back over the other industries, but their number was so small (0.2% of total employment in 1910) that we simply left them in "public service."

In professional service we had to contend with lawyers, judges, and justices, abstractors, notaries, and justices of peace. As mentioned

above, for 1910 in table 3.2 we divided workers in these categories between the "service" and "government" categories. Table 3.3, follows the same convention.

Finally, we had to distribute the clerical workers among industries. Clerical workers were a significant share of the labor force in 1910 (4.6%) and between 1870 and 1910 they were also the fastest growing of the type I occupations.[35] We used the following method of distributing the clerical workers. First we calculated the share of all clerical workers working in each industry in 1910, using the published census data that underlie table 3.2. We then assumed that the distribution of clerical workers between industries was the same between 1870 and 1910. The total number of clerical workers in each year, reported by Edwards, was then distributed amongst the various industries on the basis of this distribution. The fraction of clerical workers distributed to each industry between 1870 and 1910 is reported in table 3.A.1.

As tables 3.2 and 3.3 show, the distributions of type I workers among industries in 1910 estimated by the two methods are close but not identical. The differences arise from two sources. First, our distribution of workers in trade, professional service, and protective service (Edwards's categories) between industries is a close, but not exact, duplicate of the 1910 census distribution of those occupations between industries. We were not able to identify all of the 1910 census categories in Edwards (e.g., weighers). Those occupations ended up in Edwards's "other" category and therefore could not be distributed.

Second, in table 3.2 we used the estimates of total employment by industry that were built into the census data. Employment by industry as a share of total employment is shown in table 3.A.2 for 1910 through 1970. Table 3.3 does not use the same information since the census has no data on employment by industry before 1900. Edwards generated an industrial distribution of workers by classifying occupations into industries. That, of course, was precisely what we wanted to avoid, preferring instead to see all occupations represented in each industry.

We compromised by using Carson's original estimates of employment by industry. There are problems with Carson's numbers, and they have been pointed out elsewhere.[35] The biggest appears to lie with the estimates for "trade" (as defined above). Since we do not use type I employment in trade in our examination of nontransaction industries, this was not a serious problem from our point of view, except to the extent that it means other industries were mismeasured.

There are no other complete series on employment by industry by decade for the entire period and all industries.[36] Therefore we used Carson's estimates combined with type I employees by industry taken from Edwards to calculate the share of type I workers by industry. Carson's employment shares by industry are shown in table 3.A.3. As

Table 3.A.3 **Employment by Industry, as a Percentage of Total Employment, 1870–1910**

Industry	1910	1900	1890	1880	1870
Agriculture, forestry, and fishing	31.42	37.54	42.85	50.03	50.21
Mining	2.86	2.61	2.00	1.81	1.53
Construction	6.23	5.72	6.09	4.77	5.82
Manufacturing	22.32	21.81	20.00	18.23	17.38
Transportation	8.19	7.00	6.22	4.69	4.77
Trade	9.13	8.46	7.69	6.64	6.07
Finance, insurance, and real estate	1.40	1.04	.69	.36	.33
Services	12.88	11.81	11.25	10.06	10.74
Government	3.54	2.76	2.51	2.28	1.94
Other	2.03	1.25	.71	1.14	1.19
Totals	100.0	100.0	100.0	100.0	100.0

Source: Daniel Carson 1949, table 1, p. 47.

Note that services include professional services and amusements and domestic and personal service.

comparison with table 3.A.2 shows, the 1910 census data are not exactly the same as Carson's.

2. Combining Type I Employment with Employee Compensation

After constructing the type I employment share estimates reported in tables 3.2 and 3.3, it was necessary to combine them with a measure of employee compensation in each industry to determine the amount of resources going to those workers reported in table 3.4. The calculation was carried out separately for three periods: 1930–70, 1900–1940, and 1870–1900. Where possible we overlapped dates to provide a basis for comparison of the different methods.

1930–70

The calculation for this period—columns 9 and 10 of table 3.4—is straightforward. We multiplied the type I employment shares from table 3.2 by employee compensation by industry for all nontransaction industries. Summing over the industries gave a total type I employee wage bill, which was then divided by GNP. Both employee compensation and GNP were taken from the *National Income and Product Accounts* (NIPA).[37]

1900–1940

This calculation—columns 5 and 6—was slightly more complicated. Type I employment shares by industry for 1920 were estimated by

taking the average of the type I shares in 1910 and 1930. Wage compensation by industry was calculated from Lebergott's data on employment by industry and average annual wages by industry.[38] The total wage bill for each industry—the product of employment and annual wages—was then multiplied by the type I employment shares to derive type I employee compensation by industry. The totals were then summed over all nontransaction industries. To determine the percentage of GNP going to type I employees, the total was divided by Kuznets's Variant I estimate of GNP.[39] Columns 7 and 8 are divided by GNP reported in NIPA for 1930 and 1940.

Columns 3 and 4 are similar calculations for 1900 and 1910 using the type I employment shares derived from the Edwards data instead of the census data. The difference for 1910 in columns 3 and 5 and in columns 4 and 6 are not substantial.

1870–1900

For the early period we utilized data from Gallman on value added by industry and Gallman and Weiss on the service industries in the nineteenth century.[40] Following the approach of Gallman and Weiss, we first calculated the income originating in agriculture, mining, manufacturing, and construction by multiplying Gallman's value added by industry by the extrapolating ratios contained in Gallman and Weiss (.6525 for agriculture and .6556 for other industries).[41] Then income originating in each industry was converted into the wage bill by multiplying by Budd's (1960, table 2, p. 373) factor shares. Then these estimated wage bills were multiplied by industry share of type I employment from table 3.3 to obtain the type I wage bill by industry.

For transportation we took the Gallman and Weiss estimates of value added and applied the Budd factor share directly to value added to estimate the wage bill. For services and government, value added was equal to total wages. The type I wage bill for each industry was calculated by multiplying the industry share of type I employment times the wage bill. These were summed across all industries. The estimate of the total type I wage bill was then divided by Gallman's estimates of GNP to derive the estimates in columns 1 and 2 in table 3.4. As the table indicates, the estimates for 1900 derived by the value-added method (cols. 1 and 2) are reasonably close to the estimates derived by the wage bill method (cols. 3 and 4).

3. Trade

We tried two ways of estimating the value of resources used in wholesale and retail trade. The first measure was derived directly from the commodity flow of GNP estimates. The commodity flow estimates begin with the value of commodity output in producer prices, then

(adding transportation costs at appropriate stages) inflate the value of commodities from producer to consumer prices by applying an estimate of the distributive markup involved in getting a product from the producer to the consumer.[42] The direct approach is to extricate from the income accounts the implicit gross distributive margin. The gross distributive margin can be used as a measure of the amount of resources used in trade, after an adjustment is made to include resources used to distribute intermediate goods, which are not included in the commodity flow estimates.

This would be sufficient if available estimates of the gross distributive margins implicit in the income accounts were readily available for the entire period, but they are not. An alternative method (the reverse commodity flow method) is to work back from the commodity flow estimates of GNP in consumer prices to generate an independent estimate of resources used in trade. This method has the virtue of continuity, but it is an additional step removed from the actual data. We have used the second method in the text, and present the results of the direct measures for comparison.

There is a conceptual difficulty in using the commodity flow estimates to generate a measure of the resources used in trade. Some goods sold to wholesalers are resold to producers rather than to retailers. The commodity flow estimates of GNP do not include the costs of distributing these intermediate goods in the gross distributive margin, since including them would inflate distributive markups and lead to an overestimate of commodity flows in consumer prices. For our purposes, however, we want to include all the resource costs of distributing all goods, final and intermediate.

For later years this is not a problem. In four years after 1958 the total resources used by wholesale and retail trade are available from the input/output tables prepared by the Commerce Department. For 1919 and 1929 Kuznets provides what appears to be a measure of the total resources used in trade, although one that is built up from the commodity flow estimates (discussed below). Before 1919, however, it is necessary to approximate the total resources used in trade from the existing data on commodity flows. This involves a combination of the work of Barger and Gallman. Table 3.A.4 presents the resources used in trade as reported by Gallman, Kuznets, and the Commerce Department, expressed as a percentage of GNP for years where figures were available.

Gallman, column 1, calculated value added in trade from the distributive trade margins in Barger and commodity flow data from Shaw. The Gallman series measures the implicit gross distributive margins that underlie Gallman's GNP estimates.[43]

The Kuznets data, column 2, were taken from *Commodity Flow and Capital Formation,* for 1919 and 1929. Kuznets reports the value of

Table 3.A.4 Measures of Total Resources Used in Trade, as Percentage of GNP

Year		Gallman (1)	Kuznets (2)	Commerce (3)	Adjusted Gallman (4)
1870	(1869)	13.11	—	—	14.23
1880	(1879)	13.56	—	—	15.40
1890	(1889)	15.80	—	—	17.69
1900	(1899)	16.38	—	—	17.92
1910	(1909)	—	—	—	—
1920	(1919)	—	19.28	—	—
1930	(1929)	—	18.97	—	—
1940	(1939)	—	—	—	—
1950	(1948)	—	—	—	—
1960	(1958)	—	—	21.18	—
	(1963)	—	—	20.21	—
1970	(1967)	—	—	20.43	—
	(1972)	—	—	18.25	—

Year		Combined Series (5)	Estimated Series (6)
1870	(1869)	14.23	16.14
1880	(1979)	15.40	18.02
1890	(1889)	17.69	18.07
1900	(1899)	17.92	19.15
1910	(1909)	—	19.07
1920	(1919)	19.28	19.57
1930	(1929)	18.97	18.74
1940	(1939)	—	20.54
1950	(1948)	—	21.87
1960	(1958)	21.18	21.18
1970	(1967)	20.43	20.43

Sources:

Column 1: Value added in Trade, Gallman and Weiss 1969, p. 306; as percentage of Gallman GNP, table 3.A.11, col. 1.

Column 2: Kuznets 1938. Calculated from table V–6, p. 309, by taking sales at retail prices (or wholesale prices for goods sold to consumers directly by wholesalers) and subtracting sales at producers prices, including transportation, for each of the commodity groups. As percentage of Kuznets GNP, table 3.A.11, col. 1.

Column 3: United States Department of Commerce, *Survey of Current Business*, for various years: 1958 from September 1965, pp. 38–39; 1963 from November 1969, pp. 34–35; 1967 from February 1974, pp. 42–43; and 1972 from April 1979, pp. 66–67. As percentage of NIPA GNP, table 3.A.11, col. 2.

Column 4: Column 1 times an adjustment factor taken from Barger. The adjustment factors for each year were: 1869, 1.09; 1879, 1.14; 1889, 1.12; 1899, 1.09. See text for references.

Column 5: Combination of cols. 2, 3, and 4.

Column 6: See table 3.A.5, col. 5, except for 1960 and 1970 when we took the Commerce Department estimate for the appropriate year from col. 3.

Note: The first year listed refers to the year we list in the text. The year in parenthesis refers to the year for which calculation was actually made.

goods in producer prices plus transportation costs and the value of the goods in consumer prices for the major types of goods. The difference in the two series is the gross distributive margin that underlies Kuznets's GNP estimates.[44] Kuznets included an estimate of the costs of distributing intermediate goods as well, so column 2 represents the total costs of resources used in wholesale and retail trade.

The Commerce estimates (col. 3) were taken directly from the input/output tables for 1958, 1963, 1967, and 1972. Column 3 measures the total resources used by wholesale and retail trade, including the costs of distributing intermediate goods between producers and all final goods to consumers.

The pre-1900 figures, column 1, are too low, as they exclude resources used in distributing intermediate goods to producers. To adjust the nineteenth-century numbers, we utilized Barger. He reports a "value added" in trade figure which appears to include all resources in trade, not merely those costs associated with distributing final goods (Barger 1960, table 5, p. 332). Barger also presents estimates of gross distributive margins for final goods only (Barger 1955, table 20, p. 70, table 23, p. 77). The difference between Barger's value-added series and his gross distributive margin series indicates that the costs of distributing intermediate goods were roughly 10% of all resource costs in trade. Since Barger and Gallman were working within the same basic framework and with the same sources, the 10% difference should be applicable to the Gallman estimates by the ratio of Barger's value-added series to his gross margin series for each year.[45] The adjusted Gallman figures are reported in column 4 of the table.

The series is put together in column 5 of the table. It has two obvious problems. First, there are gaps in 1910, 1940, and 1950. Second, the long gap falls between the Kuznets and Commerce figures, and we are concerned about the comparability of the two series (the Gallman numbers were designed to be compatible with Kuznets). Given the long gap there was no way to insure that conceptual differences in the two series would be minor. Our solution was to construct a series that could be linked up with the Commerce series for total resources in trade and benchmarked to the Kuznets numbers for 1919 and 1929. The method involved working backward from commodity flows valued in consumer prices. Table 3.A.5 provides details of the calculation. We began with the flow of goods to consumers for perishables, semidurables, and durables, producers' durables, and construction materials from Gallman, Kuznets, and Shaw for years between 1869 and 1949, column 3. Then we took Barger's estimate of the share of all commodities that go through distributive channels, column 1, and his estimate of the average distributive markup as a percentage of retail prices, column 2. We multiplied the commodity flows by those two figures and then

Table 3.A.5 Estimating the Gross Resources Used in Trade by Reversing the Commodity Flow Method

Year	Percentage of Finished Goods Going through Trade (1)	Distributive Markups as Percentage of Retail Price (2)	Commodity GNP in Trade (Billions) (3)	Resources Used in Trade (Billions) (4)	Percentage of GNP in Trade (5)
1870 (1869)	65	32.7	5.63	1.27	16.14
1880 (1879)	71	33.7	6.77	1.72	18.02
1890 (1889)	71	34.7	8.50	2.22	18.07
1900 (1899)	75	35.4	11.01	3.10	19.15
1910 (1909)	75	36.5	19.43	5.64	19.07
1920 (1919)	75	36.5	47.29	13.74	19.57
1930 (1929)	77	37.0	54.42	16.45	18.74
1940 (1939)	80	37.3	57.14	18.09	20.54
1950 (1948)	80	37.4	164.57	52.25	21.87

Sources:

Column 1: Barger 1955, table 10, p. 22.

Column 2: Barger 1955, table 26, p. 92.

Column 3: 1869–99: Commodity flows were taken from Gallman (1966), and from Shaw (1947). Commodity flows include flows to consumers of perishables, semidurables, and durables (Gallman, table A–2, p. 27); manufactured durables (Gallman, table A–3, p. 34); and construction materials (Shaw, table I 1, p. 65).

1909–48: commodity flows were taken from Kuznets (1961), and Shaw (1947). Flow of goods to consumers includes perishables, semiperishables, and durables (Kuznets, table R–27, pp. 565–66); gross producers' durables (Kuznets, table R–33, pp. 596–97); and construction materials from Shaw. For 1909 and 1919 construction materials were taken directly from Shaw (table I 1, pp. 64–65). For 1929–48 we estimated the volume of construction materials by extrapolating construction materials on the basis of the volume of gross construction, reported in Kuznets, p. 524. The extrapolation ratio was .4831, the average ratio of construction materials to gross construction reported by Kuznets and Shaw for the period 1869–1919.

Note that the Gallman data are decade averages, the Kuznets data are 5-year averages, and the Shaw data are single-year estimates.

Column 4: (1) * (2) * (3) * 1.0612. The adjustment factor, 1.0612, was used to benchmark the series to the estimates of gross distributive margins in Kuznets (1938), as reported in col. 2 of table 3.A.4.

Column 5: Column 4 as percentage of Gallman/Kuznets GNP, table 3.A.11, col. 1.

Note: The estimating method is described in the text. The year listed first is reported in the text; the year in parenthesis is the year for which the calculation was actually made.

benchmarked the estimates to Kuznets's gross distributive margins in 1919 and 1929, column 4. The total resources were then converted to a percentage of GNP, column 5. They are also reported in column 6 of table 3.A.4.

This method has several advantages. First, it gives us a continuous and conceptually consistent measure for the entire period from 1869 to 1948. Second, the estimates of resources used in trade are consistent

with Gallman's and Kuznets's GNP series. Third, the estimates link up chronologically with the Commerce estimates, although they do not overlap. As a comparison of columns 5 and 6 indicates, the two methods of estimating resources used in trade generate similar results, the major difference being a lower level of resources used in trade in the early part of the period in the Gallman series. Table 3.5 in the text uses the figures in column 6 of table 3.A.4.

As discussed in section 3.1, we do not want to include transportation costs in trade as part of the transaction sector. Investigation indicated that the total resources used for transportation in wholesale and retail trade were fairly small, around 5% of total resources in trade. From the input/output tables it was possible to determine the volume of intermediate inputs purchased by the trade industries that were used for transportation. These included purchases from the petroleum refining and related industries; motor vehicles and equipment; aircraft and parts; and transportation and warehousing. For the years 1958, 1963, 1967, and 1972 these categories averaged 1.855% of total resources used in trade, surely an overestimate of expenditures on transportation, given the volume of petroleum products used for heating. The occupational data from the census of 1970 enabled us to construct an estimate of transportation-related employment in trade by using the following categories: transport equipment operatives; automobile mechanics and repairmen; and freight, stock, and materials handlers. Again, the latter category includes a significant number of nontransportation workers. Total employment in these categories was 7.88% of total employment, and 7.88% of employee compensation in trade would account for 3.35% of total resources used in trade. Similar calculations for earlier years could not be made because of a lack of detail for female employees, but male employment in the transportation occupations was similar for earlier years. Given that transportation accounts for a small part of the resources used in trade, and lacking an effective way of extending that estimate into the earlier years, we chose not to net transportation out of the resources used in trade.

4. Finance, Insurance, and Real Estate

The estimates of resources used in FIRE (table 3.6) presented several problems: finding comparable data series, dealing with the imputed services of owner-occupied housing and rental income, and working out a method to extend the series back to 1870. Our starting point was the input/output tables for 1972, 1967, 1963, and 1958. Finance and insurance were considered separately from real estate.

Table 3.A.6 provides the series used to construct the finance and insurance estimates. After 1958 the input/output tables provide a direct measure of the total resources used in finance and insurance, column

Table 3.A.6 Estimates of Resources Used in Finance and Insurance, from Input/Output, NIPA, and Kuznets 1920–72 (Billions of Dollars)

Year	National Income Finance & Insurance (1)	Actual Resources (2)	Estimated Resources (3)	Ratio Actual/ Estimated (4)	Estimated Resources Finance & Insurance (5)
1958	14.16	26.4	25.3	1.042	—
1963	17.89	33.7	32.0	1.054	—
1967	26.33	47.8	47.1	1.015	—
1972	40.39	77.9	72.2	1.079	—
Mean				1.047	
1920*	1.69	—	—	—	3.2
1930*	2.47	—	—	—	4.6
1930	2.90	—	—	—	5.4
1940	2.63	—	—	—	4.9
1950	7.00	—	—	—	13.1
1960	16.34	—	—	—	30.6
1970	34.06	—	—	—	63.8

Sources:

Column 1: 1930–72: National income in finance and insurance from United States Department of Commerce 1981, table 6.3, pp. 229–33.
1920*–1930*: Kuznets 1941, table F–1, p. 731.

Column 2: United States Department of Commerce, *Survey of Current Business,* for various years: 1958 from September 1965, pp. 38–39; 1963 from November 1969, pp. 34–35; 1967 from February 1974, pp. 42–43; and 1972 from April 1979, pp. 66–67. Includes the sum of materials used and value added in finance and insurance.

Column 3: To account for the use of materials in finance and insurance, the income-originating figure was multiplied by 1.7882. Materials averaged .7882 of value added for the 4 years covered by the input/output tables.

Column 4: (2)/(3).

Column 5: National income in finance and insurance times 1.8597. National income in finance and insurance from col. 1. The 1.8597 figure is the product of the adjustment factor for materials (1.7882) and the adjustment factor to benchmark the estimates to the input/output estimates (1.047).

2. To extend the series back to 1920 we utilized information on national income in finance and insurance from NIPA and Kuznets, column 1. First we estimated the intermediate goods used in finance and insurance by taking the average ratio of value added to intermediate goods in finance and insurance from the input/output tables. We then adjusted national income in finance and insurance to reflect intermediate purchases, column 3. We found, however, that in the years for which we had both the input/output estimates and national income data (1958, 1963, 1969, 1972) this method underestimated total resources used by about 5% (col. 4). In making the estimates for the earlier years (1920–70) we accounted for this by transforming national income in finance

and insurance by a constant factor, which accounted for intermediate purchases and the underestimate, column 5.

Table 3.A.7 provides the series used to construct the estimates of total resources used in real estate. There were two problems with extending these estimates back to earlier years: netting out rental income, and accounting for the purchase of intermediate goods. We began by taking national income from housing, column 1, and then subtracted rental income in housing (both actual and inputed), column 2. Had we been able to establish a relationship between the volume of intermediate good purchases and national income from housing we could then have modified column 3 as we did for finance and insurance. It was not possible to do so, however, since evidence from the input/output tables did not indicate a stable relationship between value added and inter-

Table 3.A.7 Estimates of Resources Used in Real Estate, from Input/Output, NIPA, and Kuznets, 1920–72 (Billions of Dollars)

Year	National Income Real Estate (1)	Rental Income Real Estate (2)	Nonrental Income Real Estate (3)	Estimated Resources Real Estate (4)	Actual Resources Real Estate (5)
1958	29.97	17.6	12.26	23.38	21.33
1963	39.93	26.8	13.13	25.03	27.69
1967	51.10	34.7	16.40	31.26	41.75
1972	74.21	48.0	26.21	49.97	66.18
1920*	5.79	4.29	1.50	2.86	—
1930*	7.30	4.27	3.03	5.78	—
1930	8.17	5.20	2.97	5.65	—
1940	6.20	3.60	2.60	4.96	—
1950	16.24	7.40	8.84	16.85	—
1960	33.66	21.30	12.36	23.55	—
1970	61.24	40.40	20.84	39.74	—

Sources: Column 1: 1930–72: National income in real estate, United States Department of Commerce 1981, table 6.3, pp. 229–33. 1920*–1930*: Net income originating in real estate from Simon Kuznets 1941, table F–1, p. 731.

Column 2: 1930–72: Rental income, United States Department of Commerce, 1981, table 1.20, pp. 69–70.
1920*–1930*: Net rent to individuals, Kuznets 1941, table F–2, p. 732.

Column 3: (1) – (2)

Column 4: (3)/0.5245. The average ratio of col. (3)/(4) for 1963 and 1958 is 0.5245.

Column 5: The difference between total resources used in real estate and gross housing output. Resources used in real estate is the sum of intermediate goods used and value added from United States Department of Commerce, *Survey of Current Business*: 1958 from September 1965, pp. 38–39; 1963 from November 1969, pp. 34–35; 1967 from February 1974, pp. 42–43; and 1972 from April 1979, pp. 66–67; includes the sum of materials used and value added in real estate. Gross housing output from NIPA, table 1.20, pp. 69–70.

mediate purchases in the nonrental part of real estate. So we went directly from national income in nonrental real estate, column 3, to an estimate of resources in real estate, column 4. We calculated the ratio of national income in nonrental real estate, column 3, to total resources in nonrental real estate from the available series on national income in nonrental real estate (we used the ratio from 1958 and 1963, as the ratios for 1967 and 1972 were considerably different). The estimated resources used in real estate appear in column 4 of table 3.A.7.

A major problem—both for finance and insurance and for real estate—is extending the series back before 1920. We used Gallman and Weiss's work on the service industries in the nineteenth century. They estimate value added in banking and insurance at decade intervals between 1839 and 1899. Table 3.A.8, column 1, presents those estimates. There is no series available for real estate. The average ratio of resources used in real estate to resources used in finance and insurance between 1920 and 1972 was used to extrapolate the volume of resources used in real estate. We applied that ratio to value added in banking and insurance for earlier years. The estimates appear in column 2 of the table.

Columns 3 and 4 of the table give the resources (as a share of GNP) for finance and insurance and for real estate for all years between 1870 and 1970. Column 5 combines the estimates for both industry groups. We bridged the 1910 break in the series by interpolating the 1900 and 1920 values. These are the figures that appear in table 3.6 in the text.

5. Government Expenditures on Transaction Services

The estimates of the transaction sector in government are detailed in tables 3.A.9 and 3.A.10. We used two methods. In the first, table 3.11, we included all government expenditures on transaction services from table 3.12, as well as transaction-related (type I) employee compensation in other types of government expenditure. The calculation of type I employee compensation in nontransaction government functions is shown in table 3.A.9. The total (col. 4) was calculated by taking government expenditures on nontransaction services (net of interest payments) (col. 3), multiplying by the percentage of government expenditures going to employee compensation (col. 2), and multiplying again by the percentage of all government employees working in transaction-related occupations (col. 1).

The second method utilized estimates from table 3.4. We simply treated government as a nontransaction industry and took the compensation of transaction-related workers directly from table 3.4. It is necessary to add to this the compensation of military personnel, excluded from table 3.4. Table 3.A.10 details the calculation of military pay. We begin with the number of active personnel, column 1, and

Table 3.A.8 **Combination of the Estimates of Resources Used in Finance, Insurance, and Real Estate, 1870–1970**

Year		Resources Used in Finance and Insurance (Billions) (1)	Resources Used in Real Estate (Billions) (2)	Finance as Percentage of GNP (3)	Real Estate as Percentage of GNP (4)	Total (5)
1870		.158	.152	2.14%	2.05%	4.19%
1880		.231	.222	2.42	2.33	4.75
1890		.431	.414	3.51	3.37	6.87
1900		.658	.632	4.06	3.90	7.96
1910		—	—	—	—	8.12[a]
1920*		3.2	2.86	4.34	3.94	8.28
1930*		4.6	5.78	5.78	7.22	13.00
1930		5.4	5.65	5.99	6.23	12.22
1940		4.9	4.96	4.92	4.96	9.88
1950		13.1	16.85	4.57	5.88	10.45
1960	(1958)[b]	26.4	21.33	5.87	4.74	10.61
1970	(1972)	77.9	66.18	6.57	5.58	12.15

Sources:

Column 1: 1870–1900: Value of output in finance and insurance, Gallman and Weiss 1969, tables A–5 and A–6, pp. 319–320. 1920–1970: table 3.A.6, (of this paper) col. 5; except for 1960 and 1970, from col. 2 of table 3.A.6.

Column 2: 1870–1900: (1) * 0.9607. The ratio of resources in finance and insurance to resources in real estate from 1910 to 1920 was 0.9607, and we used that ratio to estimate the earlier years.

1920–70: table 3.A.7, col. 4; except for 1960 and 1970, col. 5, table 3.A.7.

Column 3: Column 1 as percentage of GNP, using Gallman-Kuznets GNP for 1870–1930* (table 3.A.11, col. 1); and NIPA GNP for 1930–70 (table 3.A.11, col. 2).

Column 4: Column 2 as percentage of GNP, using same GNP as col. 3.

Column 5: Cols. (3) + (4). NIPA GNP for 1930–70 (table 3.A.11, col. 2).

[a]Value for 1910 interpolated between 1900 and 1920.

[b]Years in parentheses represent year for which calculation was made.

multiply by basic pay plus allowances, column 2, to get military payrolls for the years between 1900 and 1940, column 3. After 1950 we took compensation of military employees, column 3, directly from NIPA.

6. A Note on GNP

We used GNP series constructed by Gallman, Kuznets, and the Commerce Department (NIPA). The relevant figures are shown in table 3.A.11. Several words of caution are in order.

First, the Gallman figures were designed to be compatible with Kuznets, and we use Gallman/Kuznets as a continuous series. The Gallman estimates are, however, decade averages, while the Kuznets estimates

Table 3.A.9 Compensation of Government Employees in Transaction-Related Occupations in Nontransaction Service Programs 1900–1970

Year	Percentage of All Employees in Transaction-Related Occupations (1)	Employee Compensation as Percentage of All Government Expenditures (2)	Government Expenditures in Nontransaction Services, as Percentage of GNP (3)	Total as Percentage of GNP (4)
1900 (1902)[a]	40.38	58.43	3.70	0.87
1910 (1913)	40.38	44.39	4.80	0.86
1920 (1922)	39.55	35.28	6.99	0.97
1930 (1932)	38.71	38.02	13.35	1.97
1940	46.40	37.46	14.75	2.56
1950	42.88	29.19	13.70	1.71
1960	37.46	26.17	15.93	1.86
1970	38.53	33.18	20.38	2.61

Sources:

Column 1: Table 3.2, type 1 employees as a percentage of all government employees.

Column 2: United States Department of Commerce 1975. Figures are expenditures for personal services (ser. Y-530, pp. 1119–20) as a percentage of total expenditures (ser. Y-522, pp. 1119–20).

Column 3: Table 3.8, col. (2) + (3).

Column 4: Columns (1) * (2) * (3).

[a]Year in parentheses is year for which calculation was actually made.

are 5-year averages. We take comparable data on other variables (e.g., trade, employee compensation, etc.) from the year on which the GNP estimate is centered. When the other variables are taken from Gallman or Kuznets they are usually 10- or 5-year averages, but when they are taken from other sources (e.g., Barger) they are often single-year numbers. We have not attempted to correct for any errors that might result from this procedure.

Second, the NIPA figures are for single years and, as is well known, the conceptual framework of the NIPA figures differs from Kuznets. Particularly important is the treatment of government. We have not addressed either of these potential difficulties directly. We have simply tried to be as clear as possible about which GNP series we are using.

Third, different series were available for different dates. Tables in the text are dated at decade intervals, but often the actual calculation was done for a nearby year (these dates are noted in the relevant tables). This often results in an estimate of the size of the transaction sector built up from different years. For example, the data for 1950 include trade data from Barger and Kuznets for 1948, and employee compensation data from NIPA for 1950. In each case the relevant magnitudes

Table 3.A.10 Compensation of Military Personnel, as a Percentage of GNP, 1900–1970

Year	Active Military Personnel (Thousands) (1)	Basic Pay Allowance (Dollars) (2)	Total Payroll (Millions of Dollars) (3)	Total as Percentage of GNP (4)
1900	126	528	66.53	0.41
1910	139	968	134.55	0.38
1920	343	1,248	428.41	0.47
1930	283	1,530	432.99	0.48
1940	592	1,811	1,072.11	1.07
1950	1,813	2,942	5,333.85	1.86
1960	1,690	3,949	6,673.81	1.32
1970	3,273	6,534	21,385.78	2.15

Sources:

Column 1: 1900–1920: United States Department of Commerce 1975 ser. Y-904, p. 1141. 1930–70: United States Department of Commerce 1981, table 6.11.

Column 2: 1900–1940: United States Department of Commerce 1975, ser. D-924, pp. 175–76. The years are somewhat different than given in the table: 1900 = 1898, 1913 = 1918, and 1940 = 1945; 1920 and 1930 were interpolated linearly between the 1918 and 1945 figures.

1950–70: We had compensation of military personnel from United States Department of Commerce 1981 (see notes to col. 3. For these years the basic pay plus allowances was computed as cols. 3/1.

Column 3: 1900–1940: cols. (1) * (2).

1950–70: Employee compensation of military employees from United States Department of Commerce 1981, table 6.5, pp. 238–42.

Column 4: Column 3 as a percentage of NIPA GNP, table 3.A.11, col. 2, except for 1900 taken from col. 1.

are converted into a percentage of GNP for the appropriate year. That is, in 1950, the trade data are a percentage of GNP in 1948 and the employee compensation data are a percentage of GNP in 1950.

7. Combining the Estimates

Table 3.13 presents the final results of our estimates. Column 1 of the table combines the estimates for the nontransactions industries, trade and FIRE. Table 3.A.12 details the combination of those elements. For 1930, where there were two estimates, we took the average of the Kuznets figure and the NIPA figure.

Table 3.A.11 GNP Estimates, 1869–1972 Gallman, Kuznets, and Commerce Department Current Prices (Billions of Dollars)

Year		Gallman-Kuznets (1)	Commerce NIPA (2)	Commerce (3)
1870	(1869)	7.4	—	—
1880	(1879)	9.54	—	—
1890	(1889)	12.30	—	—
1900	(1899)	16.20	—	—
1902		—	—	24.2
	(1909)	29.60	33.4	—
1910	(1910)	30.90	35.4	—
1913		—	—	40.3
	(1919)	70.20	84.2	—
1920	(1920)	72.60	91.5	—
1922		—	—	74.0
	(1929)	87.80	103.4	—
1930	(1930)	80.00	90.7	—
1932		—	—	58.0
	(1939)	88.10	85.2	—
1940	(1940)	95.90	100.0	—
	(1948)	219.40	259.5	—
1950	(1950)	254.70	286.5	—
	(1958)	—	449.7	—
1960	(1960)	—	506.5	—
1963		—	596.7	—
1968		—	873.4	—
1970	(1970)	—	992.7	—
	(1972)	—	1,185.9	—

Sources:

Column 1: 1869–99: Gallman 1966, table A-1, p. 26. Note that the figure reported for 1869 is a single-year number, which was graciously provided by Gallman from his worksheets. Otherwise the data represent decade averages (e.g., 1880 equals 1874–1883).
1909–50: Kuznets 1961, table R-25, pp. 561–62, Variant I. The data are 5-year moving averages centered on the parenthetical year.

Column 2: United States Department of Commerce, 1981.
1909–20: Table 1.22, p. 72.
1929–72: Table 1.1, pp. 1–2.

Column 3: United States Department of Commerce 1969, p. i.

Table 3.A.12 The Size of the Transaction Sector in the Private Sector of the Economy as a Percentage of GNP, 1870–1970

Year	Compensation of Employees in Transaction-Related Occupations (1)	Trade (2)	Finance, Insurance, and Real Estate (3)	Total (4)
1870	2.16%	16.14	4.19	22.49
1880	2.50	18.02	4.75	25.27
1890	4.18	18.07	6.87	29.12
1900	3.32	19.15	7.96	30.43
1910	4.32	19.07	8.12	31.51
1920	7.25	19.57	8.28	35.10
1930	6.84	18.74	12.61	38.19
1940	6.67	20.54	9.88	37.09
1950	7.98	21.87	10.45	40.30
1960	9.52	21.18	10.61	41.31
1970	10.40	18.25	12.15	40.80

Sources:
Column 1: Table 3.4. For years 1870–1890, col. 1
1900, col. 3
1910–30, col. 5
1940–70, col. 9
Column 2: Table 3.5, col. 2.
Column 3: Table 3.6, col. 2.

Notes

1. For Williamson's work, see Williamson (1975, 1979, 1981). Also see Stigler (1961), Alchian and Demsetz (1972), Jensen and Meckling (1976), and Barzel (1982).

2. For example, see Williamson's detailed classification system for different types of transactions in Williamson (1979), pp. 246–48.

3. Simon Kuznets, "Quantitative Economic Research: Trends and Problems," 50th Anniversary Colloquium, NBER, pp. 18–19.

4. Williamson (1979, p. 245) explicitly recognizes this when he says, "The object is to economize on the *sum* of production and transaction costs."

5. Note that things like "establishing credibility as a seller" can include a variety of activities: establishing brand names, investing in unsalvageable assets, making "ideological" efforts to convince the buyer that the seller is honest, etc.

6. Note that transaction costs do not include costs incurred to change the good. In this example, the seller may choose to paint the house rather than lower the asking price. The cost of painting is not a transaction cost, since what will now be exchanged is a "newly painted" house, and the seller would have had to incur the costs of painting the house if he were selling a "newly painted" house to himself. This is discussed in more detail later in the section.

7. For example, Williamson (1981, p. 1537) takes as his central theme that "the modern corporation is mainly to be understood as the product of a series of organizational innovations that have had the purpose and effect of economizing on transaction costs."

8. Some reflection on this emphasizes the importance of the definition of the good being exchanged. You can buy cut flowers from a florist or seeds from a gardening store. Are the costs of planting, weeding, and watering the transaction costs of buying the

seeds? Clearly not. The good being exchanged in the first instance is flowers, in the second instance it is seeds. Making seeds into flowers requires home production. Planting, weeding, and watering are transformation, not transaction, costs.

9. The actual amount of nontransaction services provided by wholesale trade and retail trade turns out to be small, as we show in the appendix. As a result we treat all of the resources used in Wholesale and Retail Trade as part of the transaction sector.

10. The nontransaction industries are agriculture, manufacturing, construction, transportation, services, mining, communications, and utilities. We include government in this sector but keep it separate from the other nontransaction industries.

11. The figure was derived by taking the 1970 share of total employment in each industry and weighting them by the type I employment shares from 1910 for each industry. The share of type I employment rose from 17.45% in 1900 to 38.78% in 1970. Of the 21.33% increase, 12.2% is attributable to increasing shares of type I employment in nontransaction industries, excluding government.

12. See the discussion and references in Lebergott (1966), pp. 132–33, and detailed notes following.

13. See Lebergott (1966), table 1, p. 118, and the discussion, pp. 188–90, and Ann Miller and Carol Brainerd (1957). Since we do not use the type I share of employment in trade in constructing our estimates, we have not attempted to reconcile the different estimates.

14. After 1930, employees' compensation was taken directly from the United States Department of Commerce (1981), table 6.5, pp. 238–47. Between 1900 and 1940 total wage bills by industry were calculated from Lebergott (1964), tables A-5, p. 514, and A-18, pp. 525–57. Between 1870 and 1900 income by industry was approximated by using Gallman's series on value added for major sectors, adjusted to reflect wage payments by using Budd's labor factor shares (see appendix).

15. Our method assumes, for example, that the percentage of foremen in manufacturing was the same in 1870 as in 1910. The occupations estimated in this manner account for 23% of all type I employment in nontransaction industries in 1910.

16. We have included some elements of trade and FIRE which may not be transaction services; for example, transportation costs in trade, and safe deposit boxes, perhaps, in FIRE.

17. See tables 3.A.4 and 3.A.5 for details.

18. See Kuznets (1961, app. B; 1946, pt. 3), Kendrick (1961, app. J); and Gallman (1966, pp. 57–60).

19. United States Department of Commerce, "Input-Output Structure of the U.S. Economy," *Survey of Current Business*, for various years: April 1979, February 1974, November 1969, and September 1965.

20. See tables 3.A.6, 3.A.7, and 3.A.8 for details.

21. We include in defense expenditures costs of international relations and veterans' benefits. The former are clearly transaction services, as they are necessary for foreign trade and for national defense. The latter are deferred compensation of military employees.

22. As Kuznets wrote, "The flow of services to individuals from the economy is a flow of economic goods produced and secured under conditions of internal peace, external safety, and legal protection of specific rights, and cannot include these very conditions as services. To include the latter implies feasibility of national income and of a flow of services to individuals outside the basic social fabric within which economic activity takes place. There is little sense in talking of protection of life and limb as an economic service to individuals—it is a pre-condition of such services, not a service in itself. . . . It is difficult to understand why the net product of the economy should include not only the flow of goods to ultimate consumers but also the increased cost of government activities necessary to maintain activities necessary to the social fabric within which the flow is realized" (Simon Kuznets, quoted in Studenski 1958, p. 198).

23. United States Department of Commerce (1972), table 1, pp. 1–16.

24. We have stayed with standard industrial classifications of activities. The transportation, communication, and utilities industry includes all type I workers reported in: railroads and railway express service; trucking service and warehousing; other transportation; communications; and utilities and sanitary services. The retail trade industry includes all workers in food and dairy products stores, and milk retailing; general merchandise and limited price variety stores; eating and drinking places; and other retail

trade. Services includes all workers in business services; hotel and lodging places; other personal services, including private household; entertainment and recreation; medical and other health services; private education; organizations; and other professional and related services.

25. United States Department of Commerce (1964), table 209, pp. 557–61.

26. 1960 is the only year in which public relations men and publicity writers appear. They number 23,350, or .054% of the labor force.

27. United States Department of Commerce (1954), table 124, pp. 261–66, and table 134, pp. 290–91.

28. That is, we assumed that 1.86% of the labor force in each industry was represented by these groups.

29. United States Department of Commerce (1943), table 58, pp. 75–80, and table 32, pp. 233–34.

30. United States Department of Commerce (1933), table 2, pp. 412–587.

31. United States Department of Commerce (1913), table VI, pp. 302–433.

32. In 1930 less than 5% of lawyers and judges worked outside of the public service or service industries. Following the 1930 distribution of lawyers between industries we allocated 90% of the lawyers to the private service industry and 10% to government.

33. United States Department of Commerce (1975), ser. Y272, p. 1100.

34. See Carson (1949); Lebergott (1966); and Miller and Brainerd (1957).

35. Employment in the clerical occupation, as classified by Edwards, table 8, pp. 104–12, increases from 0.63% of the labor force in 1910, to 8.24% in 1930. Brainerd and Miller identify clerical workers as a problem group (p. 398), and they adopt methods to distribute them among industries in 1880 and 1900 (pp. 480–88). We wanted a simpler method that could be applied to all years between 1870 and 1910. Our estimates for 1880 and 1900 do not differ significantly from theirs.

36. For example, Lebergott (1966, table 1, p. 118) covers the time period but does not give a complete industrial specification of employment. Brainerd and Miller (1957, table 2.8, p. 399) cover the industries but omit 1870 and 1890.

37. Employee compensation by industry was taken from United States Department of Commerce (1981), table 6-5, pp. 238–42. GNP was taken from table 1-1, pp. 1–2.

38. Stanley Lebergott (1964). Employment was taken from table A-5 and annual earnings from table A-18.

39. See table 3.A.11 for GNP data and sources.

40. Gallman (1960), table A-1, p. 43; and Gallman and Weiss (1969), table A-1, p. 306.

41. See Gallman and Weiss (1969), source notes, table 1, pp. 288–89.

42. Of course, this process is quite complicated, involving different markups for different kinds of wholesale and retail outlets, different amounts of product distributed direct, through wholesalers, and through wholesalers and retailers. See the extended discussion in Kuznets (1938, vol. 1, pts. III, IV, and V) and Barger (1955).

43. The series is taken from Robert Gallman and Thomas Weiss (1969, pp. 305–7). As Gallman and Weiss indicate, their series on value added in trade is the same series that Gallman used in constructing his nineteenth-century GNP estimates, Gallman (1966). We have called it the Gallman estimate in the text.

44. The figures are reported for different types of goods and for different methods of distribution, i.e., direct from wholesaler, direct from retailer, and through wholesaler and retailer. See Kuznets (1938).

45. Gallman's figures are based on Barger's figures. The difference is that Gallman uses Barger's numbers as a basis for extrapolation back from Kuznets's 1909 figures on gross distributive margins rather than using Barger's numbers directly. See Gallman (1966, pp. 36–37).

Comment

Lance E. Davis

Wallis and North have set out to measure the level of "transaction costs" in the American economy and to examine changes in the levels of those costs over the past hundred-odd years. Such a task is indeed a bold undertaking; however, like any sea captains undertaking a voyage into uncharted waters, they should be aware of dangerous lee shores marked by uncharted and threatening reefs—and in this instance, none seem more threatening than those raised by language and logic. On the one hand, the concept of transaction costs, although living an apparently robust life in the modern economic literature, has never been well defined. On the other, measurement by its nature demands a taxonomy, but the scheme, if it is to be useful, must be tailored to the questions to be answered. In this instance it is not at all clear that the taxonomy chosen will lead to a useful analysis of the questions North and Wallis would like to see answered or indeed how it necessarily relates to the existing literature. Consider for a moment the words in a famous dialogue (Carroll 1981, p. 169):

> "When I use a word . . . it means just what I choose it to mean—neither more nor less."
> "The question is . . . whether you can make words mean many different things."
> "The question is . . . which is to be master—that's all."

Professors Wallis and North have cast themselves in the role of Humpty Dumpty; and at times it appears that Alice's concerns may be warranted.

It has been alleged that transaction costs have provided the refuge for those economists who take the Coase "theorem" as an act of faith, and who find that the world does not appear to behave in a way that conforms to the predictions of that "theory." Thus transaction costs have been defined by one, perhaps not unprejudiced, theorist as "anything necessary to make the Coase 'theorem' go through." Or, according to a second—and perhaps less critical—economist, "transactions costs are a useful notion whose usefulness declines proportionately with the preciseness of the definition."[1] The term is used to cover a variety of phenomena not normally included in economists' models; and as economic fashion has changed, so has the definition. Originally there were marketing costs, and for economists whose interests were not in trade or location, transport costs as well. To those time has added information, monitoring, and negotiation costs; but, as interest

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1. Many theorists blanch at the use of the term "theorem" in reference to the Coase conjecture. The economists cited are James Quirk and Charles Plott.

in the spatial allocation of economic activity expanded, transport costs have often come to be considered independently; and, more recently, it appears that retail and wholesale trade may have been excluded as well.

While agreement is far from complete, a list that encompassed the costs associated with "greasing" markets and including, but not limited to, (1) obtaining information, (2) monitoring behavior, (3) recompensing middlemen, and (4) enforcing contract, might well encompass most of the transaction costs to which economists refer. They are the factors that drive a wedge between actual markets and the competitive ideal; and they are factors that have traditionally been excluded from the economists' models. To Wallis and North transaction costs are "the resource costs of maintaining and operating the institutional framework associated with capturing the gains from trade." They admit, however, that it is difficult to operationalize this broad definition and therefore attempt to ease the problem by distinguishing transaction costs and transaction services (that fraction of transaction cost that actually passes through the marketplace). It is the latter they attempt to estimate. But like Letty Palmer's dog who thought he knew what a cat was until he met a leopard, neither definition provides a formula for converting the "useful notion" into a set of estimates (Huxley 1959).

On a second, closely related point, Wallis and North may, perhaps, legitimately cry foul. They have established a taxonomy that might permit Chang to distinguish Nubian from jungle cats; but unlike Chang, it is not yet clear just why they care. Since the purpose of the categorization is only partially revealed, it may well be unfair to criticize them for producing a taxonomy that may not provide the distinctions that they desire.

The literature raises a number of questions that might be answered by an analysis somewhat similar to that of Wallis and North. Almost 40 years ago Simon Kuznets drew attention to the distortions in international income comparisons that arise from the inclusion in the calculation of the service income of developed countries certain charges that represent costs rather than income:

> First such activities as beyond any doubt represent payments by consumers for services that are nothing but occupational facilities should be excluded from the estimates for both types of country. Clear examples are commutation to and from work, and payments to unions and employment agencies; but one might add almost the entire gamut of what the Department of Commerce classifies as business services. . . . Second, where in industrial societies the costs of consumer services are inflated by the difficulties of urban life, some revaluation of these services by comparison with their costs in rural communities is in order. . . . Finally, it seems indispensable to include

> in national income only such governmental activities as can be classified as direct services to ultimate consumers. (Kuznets 1947, 5:219)

A second class of problems was raised by Seymour Melman (1956) almost 30 years ago, as he attempted to explain the growth of industrial productivity in Britain and America between 1900 and 1950. Melman found that the ratio of administrative personnel to production workers had increased in both countries; and he concluded that this growth acted as a brake on total productivity increase since productivity growth in the administrative areas has been slow. Henry Ford, it might be noted, had the same feeling, and it is alleged that he attempted to solve the problem by periodically firing alternate rows of accountants (Sorenson 1957; Hughes 1966).

From the tone of this work, it is questions like those of Kuznets and Melman that will be the subject of the next canto of the Wallis and North epic. If that assumption is correct, then the operational taxonomy they have selected may well make analysis difficult, if not impossible. Kuznets recognized the problems involved in constructing such a taxonomy, but concluded, "This most important and inescapable step is urged here in full cognizance of the statistical difficulties, which are great."

Obviously both transformation and transaction costs are important, and equally obviously economists have tended to ignore some transaction costs. Costs are costs, however, and while all should be recognized in most economic analysis, it makes little difference into which category they fall. Consider the following example. A firm produces widgets with an average cost function of the form $C = L$. Mother nature is tough, and for the firm to maintain a required inventory level it is necessary that they produce two widgets for every one they sell. Then the total cost involved in the production of a widget is $2L$. In the Wallis and North taxonomy all of their costs are transformation costs. Assume that an intermediary capable of capturing certain economies of scale inherent in inventory centralization opens with average transaction cost of the form $C = 1/2\ L$.

It is not important that average transaction costs have risen from zero to $1/2\ L$ or that transformation costs have fallen from $2L$ to L. All that is relevant is that total costs have declined from $2L$ to $3/2\ L$. Wallis and North are correct in arguing that all costs should be recognized. They are incorrect in their assertion that it makes any difference whether the costs are transaction or transformation.

Wallis and North classify all costs into their "production" and "transaction" components. While that goal may be unexceptionable, the location of the intercost boundary becomes critical, if the purpose is to answer questions similar to those articulated by Kuznets and

Melman. Wallis and North argue that "the transaction sector involves all the resources necessary to coordinate, execute, monitor, and enforce exchanges of property rights to goods and services." While that definition may be intellectually adequate, it is not operationally so, and it can serve as no more than a rough guide for an attempt to actually disaggregate and recombine a myriad of statistics collected with a variety of other purposes in mind. The problem is enormous, but the authors attack it with verve and with at least a dull ax if not a razor-sharp scalpel. As a first step, they divide the economy into public and private sectors, and they begin their analyses with the former. In that sector, they argue, for certain industries all costs are transaction costs. For the remainder (industries with a production cost component) there are some activities that should be classified in the transaction sector. The problem, however, still remains the same—where do you draw the line both between and within industries?

It is difficult to define precisely the line the authors have chosen to draw, but loosely it appears that they have placed activities associated with a physical transformation of the final product into production costs while all other activities have been consigned to the transaction sector.[2] On the basis of this or perhaps some other criterion, they place wholesale and retail trade and finance, insurance, and real estate completely within the transaction sector. For the remainder of the private business sector, five classes of activities (owners, managers, and proprietors; clerical workers; sales workers; foremen and inspectors; and police and guards) are also assigned to the transaction sector. (Accountants and lawyers and judges are somehow included in these categories.) Thus equipped, the authors examine the trends in the private sector's transaction costs.

Their estimates indicate that over the period from 1870 to 1970 the share of the transaction sector rose from something less than 25% to almost 40% of the labor force (tables C3.1 and C3.2). This conclusion, however, depends on the line they have drawn between production and transaction costs, and it is not robust to relatively minor respecifications. If farmers (they were, after all, sole proprietors with substantial managerial responsibilities) are included and clerical workers excluded (one can certainly argue that some of their activity is product enhancing) from the transaction sector, the proportion, instead of rising by one-half, falls by one-third.[3] Similarly, a redefinition of the finance, insurance, and real estate industry to exclude commercial banking would reduce that industry's contribution to total transaction costs by about 15%.

2. To the extent that this inference is correct, one might ask why transport is not part of the transaction sector.

3. See table 3.C.2. Under the recalculation the proportion falls from 32% to 22%.

Table C3.1 **Type I Workers**

Occupation	1970	1960	1950	1940	1930	1920	1910	1900
Accountants	712	477	390	238	192	118	39	23
Lawyers & judges	273	213	184	182	161	123	115	108
Personnel & labor relations	296	99	53					
Farm managers	94	50	53	55	68	93	50	17
Managers	6463	5489	5155	3770	3614	2803	2462	1697
Clerical	14208	9617	7232	4982	4336	3385	198	877
Sales workers	5625	4801	4133	3450	3059	2058	1755	1307
Foremen	1617	1199	867	585	551	485	318	162
Inspectors	201	169	144	116	100	93	68	30
Police & guards	747	543	478	397	317	228	162	121
Total	30236	22657	18689	13775	12398	9386	6956	4342
Total labor force	79568	68658	58403	51019	49592	42664	36611	28947
Total as % of all	38%	33%	32%	27%	25%	22%	19%	15%

Table C3.2 **Type I Workers (Alternative Definition)**

Occupation	1970	1960	1950	1940	1930	1920	1910	1900
Accountants	712	477	390	238	192	118	39	23
Lawyers & judges	273	213	184	182	161	123	115	108
Personnel & labor relations	296	99	53					
Farm managers	94	50	53	55	68	93	50	17
Farmers	1428	2501	4290	5324	5992	6384	6132	5752
Managers	6463	5489	5155	3770	3614	2803	2462	1697
Sales workers	5625	4801	4133	3450	3059	2058	1755	1307
Foremen	1617	1199	867	585	551	485	318	162
Inspectors	201	169	144	116	100	93	68	30
Police & guards	747	543	478	397	317	228	162	121
Total	17456	15541	15747	14117	14054	12385	11101	9217
Total labor force	79568	68658	58403	51019	49592	42664	36611	28947
Total as % of all	22%	23%	27%	28%	28%	29%	30%	32%

The problem is twofold. On the one hand, an operational definition is necessary to distinguish between production and transaction activities. On the other hand, even that definition may be insufficient to disentangle the activities given the way the data are reported. The standard taxonomy is based on a "one man/one job" philosophy; and it is not necessary that an individual's activities always fall completely into either the production or transaction sectors. The farmer who is part manager and part field hand is a case in point.

The latter problem becomes particularly troubling when an attempt is made to compare structures at widely separated points in time. Two caveats, both involving comparative advantage, must be kept in mind. First, as the size of an enterprise increases, it may be possible to divide tasks between individuals and thus capture the gains from specialization and trade. These gains rest on an indivisibility and are the basis for Adam Smith's oft-quoted dictum, "the division of labor is limited by the extent of the market."[4] The census does not report that a farmer is one-third a manager and two-thirds a field hand, but it may well report that a somewhat larger farm is operated by one manager and two field hands. Second, even in the absence of scale economies technological progress may have changed the relative prices of generalized and specialized activities and therefore altered comparative advantage. An adjustment to capture these potential gains could result in an increase in the reported size of the transaction sector even if the result had been a net reduction in the costs of transaction services.

If the theoretical problems of measurement in the private sector were difficult, they pale in comparison to those raised by the public. Wallis and North are not blind to the magnitude of their task. They argue: "In a fundamental sense our broad conception of transaction services would include all of government in the transaction sector." The theoretical gain from that decision is somewhat opaque, but it certainly would have eased the measurement problems—problems that arise not from a shortage of data but from difficulties in classification.

Wallis and North begin (like Caesar) by dividing all Gaul into three parts: (1) expenditures for the defense and enforcement of property rights and investments in large social overhead public works, that are designed to facilitate trade, (2) expenditures in support of basic services, and (3) transfer payments. The first they classify as purely transaction costs (in a manner similar to their treatment of W&RT and FIRE in the private sector); the latter two as "output producing" but with some transaction components. Both present problems.

4. Some economists have argued that a transaction cost is any cost beyond those that would have been incurred in a Robinson Crusoe economy. It has, however, been noted that even Crusoe had to devote some resources to keeping the mice out of his bread, and thus all of his labors should not have been assigned to the production sector. For that reason John Wallis has termed the indivisibility problem the "mouse problem."

As to the first, included in expenditures of type I are defense, the postal service, certain public works, and general administrative costs. The authors explicitly recognize some, but not all, of the problems inherent in this classification. They note that a portion of the military expenditures may really be transfer costs reflecting nothing but realized American economic philosophy: socialism for the rich and capitalism for the poor. While the "military-industrial" complex may receive a substantial subsidy, it is not clear that there are not other transfers lurking in the expenditure totals. How much, for example, of veterans' programs should be viewed as payments for services received and how much as subsidies? In a similar vein, one might wonder what fraction of jobs in the postal service or the governmental administrative bureaucracy have a substantial transfer component. An interest-free loan of $15,000 appears to have produced an annual family income of nearly $100,000 in a recent example.[5]

The authors also do not appear to recognize a second and perhaps even more troublesome source of problems. Even in these "clean" transaction categories, a fraction of the expenditures may, in Kuznetsian terms, provide direct services to ultimate consumers. There is certainly a consumption component in both the post office and in the expenditures on airports and air control. One has only to contrast the 40 and 8 character of a coach section of a transcontinental flight with the uncrowded luxury of the adjacent first-class compartment to get a feel for the transaction/consumption ratio of the air transport industry or watch a mailman drive his route through suburban Belair under the watchful surveillance of a dozen security guards to understand that there are many besides businesses who use the mails. Those examples are clear-cut, but one might also wonder, although perhaps partly in jest, if there is not a consumption component in defense expenditures as well. It has long been argued that the British empire in the late nineteenth-century provided consumption for the middle and working classes, and certainly the same specter has been raised by the Far Left about more recent American adventures. While the latter obviously political charges clearly do not deserve a response, one might still wonder what behavior the next generation of historians will adduce to explain the recent fiasco in Grenada.

Finally, and more troubling, is the authors' response to their own question of the theoretical implications of the transfer component of the defense budget: "but beyond a doubt, these expenditures are the expenses of maintaining national security, given our current political

5. If the indivisibility can be called the mouse problem, this problem might be dubbed the "meese problem."

and social arrangements." There is no evidence at all that this conclusion is correct, and even if it were, it seems totally misdirected. The authors' research agenda appears to be directed at the design of institutions capable of minimizing transaction costs. Next year the taste for "star wars" weapons systems may decline and the transfers reappear in new disguises (perhaps like the Chrysler bailouts, perhaps somewhere in the Commerce Department budget). It may be economically efficient to maintain a strong defense posture (and those costs can be viewed as transaction costs), and it may be a political necessity that we subsidize the arms merchants, but to lump the two together and argue that they are the same animal casts substantial doubt on the ultimate usefulness of the taxonomy, if its purpose is institutional design or redesign.

The authors next explore governmental expenditures on basic services and transfers. For those classes they admit a production component and include only the "transaction workers" in their calculations. Again, however, the transfer problem raises its head; some fraction of those workers' activities can best be viewed as transfers rather than as costs (production or transaction). The Indiana personal property tax that raised just enough income to pay the assessors (who were also the party workers) and Mayor Washington's decision to keep all city workers (including the 8,000 precinct captains) on their jobs on primary day, which created political chaos in Chicago, are two cases in point.

From their analyses of these "productive" governmental sectors, Wallis and North conclude that "these [transaction] costs are higher in the public than private sector"; but this "conclusion" may well be tautological given their definition. There are, after all, few factory workers, barbers, or fieldhands working for the government.

Even if one accepts the Wallis and North taxonomy, these figures indicate that a large fraction of the observed trends in governmental transaction costs are rooted in the defense sector alone. Even if we assume that there is neither a transfer nor a consumption component in these activities, one may still wonder whether the "growth of the transaction sector" reflects much besides perceived change in the foreign climate. An extension of table 3.12 to 1980, for example, causes the percentage of pure governmental transaction expenditures in GNP to fall from 11.3 to 8.5. A further extension to 1984 would undoubtedly show a second reversal. In both instances it is difficult to see what has changed, except the party in power.

With their public and private estimates in hand, the authors merge the two to provide a single measure of the trends in "transaction costs"; and, in their conclusion, they provide some interpretation of those results.

The same questions raised about the public and private sector estimate cloud the merged series; and further questions are raised by interpretations, as cautious as they are, presented by Wallis and North. First, they have a tendency to assert conclusions that cannot be inferred from their logical structure. For example, they have presented evidence that transaction costs are important and perhaps too frequently overlooked by economists. That assumption is insufficient to support their conclusion that throughout economic history transaction costs have been as much a limiting factor in the growth of specialization as transformation costs and that economic history is the story of the reduction of transaction costs that permit the realization of gains from specialization. These are strong statements and cannot be inferred merely from a recognition of the fact that transaction costs can be important.

Second, some of Wallis and North's conclusions are presented with neither logical nor empirical support. For example, they argue: "First, while competition in the private sector ensures that more efficient organizational forms will replace less efficient ones, no such constraints operate on government. . . . Our second point is that the *growth* of the transaction sector is a necessary part of realizing the gains from trade." They adduce no evidence in support of either assertion; in fact, they suggest the governmental institutions have been very efficient in specifying and enforcing property rights.

Third, Wallis and North argue that the explanation for the growth of the transaction sector is rooted in three historical developments (costs of enforcing contracts rise with the growth of markets and urbanization; transaction costs rise more than proportionately as firm size increases; and the costs of political manipulation have decreased over time). All three raise either empirical or theoretical questions. Since, however, the authors themselves admit that "this paper presents no conclusive proof that any or all of these three elements is the correct explanation of the growing importance of the transaction services within the economy," it may not be productive to raise them.

Finally, the authors conclude that their restructuring of the national accounts can produce new insights into the forces effecting growth and changes in the structure of economic activity. Such a result would be very important, but unfortunately Wallis and North do not make it at all clear exactly which new questions should be posed nor how the accounts should be manipulated to obtain the desired results.

Wallis and North have set out a major research agenda; it is an agenda that focuses on the set of institutional arrangements that shape the direction and speed of growth and change in the economy; and it is an agenda that, if completed, would provide the glue to meld market

and nonmarket analysis together in a true theory of political economy. The project is indeed immense, and that the authors have not totally succeeded is hardly surprising. Wallis and North end by concluding "that the growth of the transaction sector is a structural change of the first order"; however, in the next phase of their research they must more explicitly relate their theory to their estimates and they must begin to explicate the implications of those transaction costs (however defined) for economic change. Otherwise there will be a strong tendency to look back to Kuznets and say, "So what else is new?"

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