Wages and Working Conditions of Truck Drivers at the Port of Long Beach

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Abstract

Using data from a survey of drivers at the Port of Long Beach, models of earnings, waiting time, and safety are estimated. These drivers, lower paid than truckers at the national level, receive no returns on experience or tenure and spend, on average, 48 percent of their work day waiting to get into and out of the Port. Paid by the trip, there is little incentive for firms to use their time efficiently and a great deal of pressure for drivers to complete trips quickly. We find that drivers who own their trucks have a higher probability of accepting unsafe chassis and taking them on the road. We conclude that the inefficient use of drivers' time leads to negative externalities of pollution and unsafe driving.

Introduction

As the volume of imports to the United States continues to grow, there is increased pressure on terminals, port drayage companies, and shippers to increase throughput at the nation's ports. One key part of this vertical chain is the port drayage driver. At the ports of Los Angeles and Long Beach (which combined are the third largest container port in the world) the vast majority of these drivers are owner-operators (drivers who own their own trucks).

There is very little known about these drivers. Anecdotal evidence suggests that they possess low levels of education, are often new to the country, and typically earn less than drivers in other segments of trucking. The purpose of this study is to use data from surveys of drivers at the Port of Long Beach to better describe this labor force, with an eye toward examining rates of pay, their work lives, and safety issues.

It is important to understand the nature of the work of these drivers. Though most are owner-operators, they do not typically operate with their own authority—they contract with harbor drayage companies. Given that these

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drayage companies rarely employ drivers, they appear to serve as brokers, linking drivers and loads. Port drayage drivers are dispatched by the firms and proceed to the port and the terminal where the load is to be picked up. Though some terminals at the Port of Long Beach have appointment systems, it is typical that these are not used (or only used for the first trip of the day). The driver waits for the proper load inside the terminal and is provided with this load on a chassis that is typically owned or arranged by the ocean carrier. The driver then leaves the port and delivers the load (typically to a local destination).

The nature of this work leads to several questions. First, how is the driver paid? Second, how much of the driver's time is spent waiting? Third, what are the safety issues facing drivers in this segment of the industry?

Description of the Data Set

The survey of drivers working at the Port of Long Beach was conducted in April and May 2004. While national data sets such as the Current Population Survey, Panel Study of Income Dynamics, and National Longitudinal Study of Youth provide detailed data that is typically used in wage studies across occupations, these data sets do not contain information that would allow researchers to distinguish port drivers from long haul drivers or any other subgroup of this occupation. There are some data sets that specifically collect data on truck drivers; however, these typically focus on long-haul and local drivers not involved in port drayage.

Focusing on drivers involved in port drayage specifically is relevant from two perspectives. First, there has been great concern about security at the nation's ports, and some of this scrutiny has been placed on drivers. Who are the drivers who have access to the freight coming into the country? Second, the labor market circumstances of port drivers, most of whom are non-union owner-operators (especially at the California ports) stand in sharp contrast to the labor group within the gates of the port—the longshoremen and clerks. The latter group is unionized, and their wages are considerably higher than workers of similar skill level.

The sampling scheme for the survey had two components. First, we randomly chose three container terminals located at the Port of Long Beach. Surveys were conducted at two of these terminals. The third was not used due to the physical structure outside the gate being inhospitable to surveying. Surveys were conducted before the gates opened, from 6 A.M.–7 A.M. The security people at the terminals requested that we leave the premises before the gates opened at 7 A.M. to ensure our safety once the lines of trucks began moving. The surveying was conducted during one week in April 2004 and one week in May 2004. The survey days included every weekday.

The second component involved choosing the drivers to participate in the

survey. All drivers who were at the wheel of their truck or standing outside their truck were approached and asked to participate in the survey. Drivers who were asleep in their bunk were not approached. The survey instrument was a self-administered questionnaire. Drivers were given a choice of taking the survey in English or Spanish. The refusal rate was approximately 35 percent, which is lower than the 50 percent refusal rate common to surveying where there is only one opportunity to approach the subject. The survey was self-administered in order to increase the sample size during the short sampling window. The resulting sample size was 175 drivers.

While we do not believe that we can consider the data representative of port drivers at the national level, we do believe the sampling scheme and participation rate allowed us to capture data representative of drivers who haul containers to and from the terminals at the Ports of Los Angeles and Long Beach.

The Use of Owner-Operators

An overwhelming number (nearly 87 percent) of drivers in the sample self-classify as owner-operators. The question is why this percentage would be so much greater than the percentage of owner-operators for over-the-road drivers (25 percent according to the Sloan Trucking Industry Program Survey of Drivers; Belman et al. 2005) or among the total population of truck drivers (10 percent in the Current Population Survey, according to the author's calculations). The answer to this question must lie in the interaction of supply and demand in this market.

On the demand side, one might question why firms would prefer to employ owner-operators to employee drivers in port drayage. This choice has its roots in the more general "make or buy" decision made by firms. Firms are more likely to "make" (produce in house) services where there are possibilities of hold-up. Clearly, in port drayage there is the potential for drivers to "hold up" firms by refusing to take loads (a problem that is also cited generally in the literature on owner-operators) (Baker and Hubbard 2004). There is some recent anecdotal evidence that port drayage companies are having problems retaining owner-operators. Like other forms of trucking (less than truck load [LTL], for example), firms face potentially high costs from failing to pick up and deliver freight on time.

Though there is potential for hold-up, why do most firms decide not to bring any trucking services in-house? Firms often "buy" services that they would have difficulty monitoring in-house. Port drayage firms could potentially monitor drivers through satellite-based systems or other GPS technology; however, this technology tends to be costly. By contracting with owner-operators and paying them by the trip, drivers have the incentive to pick up and deliver

loads as quickly as possible in order to maximize their income. Thus, "buying" services with appropriate contracting (for example, pay per load) aligns the interests of firms and drivers without the firms paying monitoring costs.

Contracting with owner-operators also reduces the firms' up-front capital costs. Firms do pay for the cost of capital—obviously drivers need to be paid enough to cover the cost of their trucks—however, they are paying for the cost of capital per load, not making an initial investment in a fleet. Firms are also somewhat protected from variability in insurance and fuel costs. Owner-operators must be paid an amount that will cover their costs; however, due to information asymmetries and lack of market power among drivers, there might be a lag between the onset of increased cost of insurance and fuel and when firms incorporate these increased costs into the rates charged to shippers (and the amount paid to drivers). There is also the possibility that drivers misprice their services due to lack of information (Peoples and Peteraf 1995).

There is some concern in the industry that owner-operators are in fact employees who happen to own their own trucks (Hamelin 1999). Aside from the cost-smoothing reasons that firms might prefer owner-operators, firms also avoid paying for benefits and never have to face collective bargaining problems with owner-operators. The self-employed are not allowed to form a union under current antitrust laws, though the Teamsters currently have a focused campaign to attempt to organize port drivers.

Obviously, considering only the demand side of the market for owner-operators overlooks the fact that some drivers have a preference to be owner-operators. Several studies find that personal characteristics influence an individual's decision to become an owner-operator rather than an employee driver (Lafontaine and Masten 2002, Peoples and Peteraf 1995). While these studies focus on factors such as age and marital status, the decision to become an owner-operator at the Port of Long Beach most likely is a function of the fact that truck driving is a job that requires little skills and does not require mastery of English. In fact, 92.9 percent of the drivers are Hispanic, and 88.6 percent of the drivers were born outside of the United States.

Thus, the supply-side decision in this case might well be the fact that port drayage provides jobs that allow the driver to attain a certain level of income with little requirements with respect to education and language skills. The mean net income (income after deducting for truck-related expenses) of the sample was $29,903, with a median income of $25,000. While this does not appear to be an overly high income, one third of the sample had less than a high school diploma and another 34.8 percent had a high school diploma as their terminal level of education.

These arguments aside, there appears to be little reason that a recent immigrant could not find work as an employee driver at a local firm. Why

choose to work as an owner-operator in port drayage? An explanation may be that they prefer the role of owner-operator since it implies that they are business owners. The choice of port drayage may come as the result of a person's social network—they see a relative or neighbor driving a truck and decide to pursue that route as well.

A Human Capital Model of Owner-Operator Earnings at the Port of Long Beach

As previously mentioned, the mean net income of drivers in the sample was $29,903. Port drivers are almost exclusively paid by the trip, thus they face economic pressures to maximize the number of trips per day. On average drivers work five days per week—in fact, there was no one in the sample who worked less than five days in the prior week. Ten percent of drivers reported working six days in the prior week. Gross pay per day in the prior pay period averaged $235, with a median of $200.

While descriptive statistics provide valuable information on the pay of this workforce, regression analysis permits examination of the factors that influence pay. Typically, human capital econometric models incorporate controls for demographics as well as firm characteristics. Given the relatively small sample size, we assume a parsimonious model of human capital. The dependent variable is driver's annual net income (income that has been adjusted for truck-related expenses). The explanatory variables include experience (years working as a driver), tenure (months leased with the current firm), and education (dummy variables are included for high school, some college, vocational or associate's degree, and college degree—the reference group are drivers who have not received a high school diploma).

Controls are also included for race (dummy variables for black and Asian, with white as the reference group) and ethnicity (a dummy variable for Hispanic). Finally, a set of dummy variables are included for firm size. Typically in the literature, there is a pay differential based upon firm size. Dummy variables are included for firms with between 25 and 99 drivers (59.7 percent of the sample), 100–249 drivers (10.1 percent of the sample), and 250 or more drivers (4.3 percent of the sample), with very small firms (less than 25 drivers) as the reference group.

Though typically there is a positive relationship between earnings and both experience and tenure, there is reason to believe that this relationship will not hold for the drivers in our sample. Belman and Monaco (2001) find no significant relationship between tenure and annual income for over-the-road drivers. Much like over-the-road drivers, port drivers in the sample have relatively low levels of tenure (mean tenure of 2 years and mean experience of 8.5 years), and there is little reason to believe that firms would reward

drivers for firm attachment when labor is easily substituted—there are few firm-specific skills in port drayage.

Though studies of over-the-road drivers and studies of drivers nationally do find a positive relationship between experience and earnings, this positive relationship may not hold for port drayage. It is more likely that drivers would move out of port drayage as they gain more experience and move into sectors that feature better pay (such as local pick up and delivery and long haul). Similarly, though generally there tends to be a positive relationship between education and earnings, there is little evidence that a driver's productivity is positively related to education.

We would expect the variables for race to be negative (since minorities are typically paid less than whites). Only 3 percent of the sample is black, and 4.5 percent of the sample is Asian or Asian American. The black-white wage differentials tend to be much lower in trucking than other occupations, however, undoubtedly due to less discrimination present in low-skill, low-paying occupations.

Finally, there is reason to believe that wages may be correlated with firm size (Belman and Groshen 1998). Workers at larger firms typically receive higher pay either due to efficiency wages, compensating differentials, or productivity differences. This last factor seems the most likely in port drayage—if larger drayage firms are more efficient their drivers could potentially complete more trips per day, increasing their total pay over the course of the year.

The estimation results are presented in table 1. The lack of significance of experience, tenure, and education support the hypotheses made a priori. Though it may seem irrelevant to include these variables in the model, their lack of significance is important in understanding the nature of skills and pay in this occupation. The coefficients on black and Asian are also insignificant, indicating no substantial race-based wage gaps in this occupation. The coefficient on Hispanic is negative and significant, however, indicating that these drivers earn approximately $11,128 less per year than non-Hispanics. This result may represent a relationship between language skills and annual income.

Finally, two of the firm size variables have negative and significant coefficients. Drivers who haul for firms that contract with 25–99 drivers earn $6,221 less over the course of the year than drivers at small (less than 25 drivers) firms. The wage gap is larger for drivers at firms with 100–249 drivers—these drivers earn $9,903 less than drivers at small firms. The coefficient on very large (more than 250 drivers) firms is not statistically different than zero. This pay differential may reflect the nature of the drivers' relationships with their firms. It may be the case that drivers at very small firms are used more intensively than drivers at medium-sized firms (thus increasing their annual

TABLE 1
Wage Estimation

Variable	Coefficient	*t*-statistic
Experience	73.053	0.34
Tenure	59.429	0.12
High School Diploma	–1825.94	–0.55
Some College	391.489	0.10
Vocational/Associate's Degree	3,586.461	0.79
College	2,978.614	0.30
Firm Size: 25–99	–6,221.417 *	–1.90
Firm Size: 100–249	–9,903.477 **	–2.11
Firm Size: 250+	–1,839.228	–0.27
Black	–9,140.689	–0.77
Asian	–1,956.887	–0.16
Hispanic	–11,128.83 **	–2.07
Constant	41,928.87	6.24
N	123	
R^2	0.15	

* significant at 10% level ** significant at 5% level *** significant at 1% level

net income) since these drivers may have a more personal connection to the firm with which they are contracting. At very large firms drivers may earn high levels of net income if these firms are run more efficiently.

A Model of Waiting Time

A key issue facing drivers in port operations is the amount of time they spend waiting at the port. Since the vast majority of the drivers are paid by the trip, their income is lowered by long lines. The increased volume of trade coming into the South Bay ports has brought increased congestion and longer lines at terminals. In order to address health concerns related to truck idling, AB 2650 was passed in the state of California; this statute fined terminal operators if they had trucks idling outside the gate for more than thirty minutes. Though this law brought considerable attention to the problems of truck congestion at the ports, the fact that terminals were not fined if they maintained appointment systems or extended gate hours, as well as the lack of manpower to monitor truck idling, has led to general consensus that the law has had little effect on the amount of time trucks spend waiting at the ports.

On average, port drivers report 48 percent of their trip time is spent waiting to get in and out of the port. A model of the determinants of waiting time is developed. As in the case of the wage model, the econometric model is fairly parsimoniously specified, with a focus on the key correlates of waiting time.

The dependent variable is the ratio of waiting time to total time of the last trip. The explanatory variables are tenure, experience, race and ethnicity, and firm deadlines.

Experience and tenure both might be negatively related to waiting time. With experience a driver may become more adept at working with firms who regularly send their drivers to more efficient terminals. The same logic might apply to tenure. With a longer relationship between driver and firm, the driver might receive preferential loads as a way of attaching the driver to the firm. Race and ethnicity are included to examine whether there are unexplained differences in waiting time based on these characteristics. The Hispanic dummy variable was significant in the wage equation, providing some support for conjecture that the lower wages might be either due to discrimination or wage skills. To test for this a variable is included that takes a value of one if the driver was born in the United States (a proxy for language skills). The Hispanic dummy variable is dropped due to colinearity.

In the wage equation, it was hypothesized that larger firms might operate more efficiently. If this efficiency is caused by using driver's time more effectively, then the coefficient should be negative for larger firms. A dummy variable is included that takes a value of one if the driver indicates that they are under strict deadlines for pickup and delivery (74.8 percent of the sample). Firms under strict deadlines might be more likely to dispatch drivers at off-peak times or to schedule an appointment with the terminal, which should reduce waiting time.

The results of the estimation are presented in table 2. Though tenure is not statistically significant, there is a negative relationship between experience and waiting time, providing support for the hypothesis that drivers who have been in the occupation longer find ways to circumvent inefficiencies. Drivers at the largest firms (250 or more drivers) have less waiting time, supporting the hypothesis that these firms may use labor more efficiently. Finally, there is evidence that those born in the United States have less waiting time that those born outside of the United States. This suggests that the lower wages earned by Hispanics may not be due to discrimination but may be somewhat attributable to language skills.

Chassis and Road Safety

The issue of chassis safety is topical in intermodal drayage (Swan 2004). Though chassis are not owned by the drivers or drayage companies, in most states the drivers are held responsible for the chassis they operate on the roads. In 2002 California enacted a chassis law that puts the responsibility for chassis safety on the chassis owner. As drivers have little time to inspect equipment and economic incentive to get in and out of the port complex quickly, it is not

TABLE 2
Waiting Time Estimation

ariable	Coefficient	*t*-statistic
Experience	–0.0060	–0.25
Tenure	–0.0012 **	–2.36
Firm Size: 25–99	–0.0400	–1.02
Firm Size: 100–249	0.0011	0.02
Firm Size: 250+	–0.1511 ***	–2.61
Black	–0.2309	–1.64
Asian	–0.0849	–0.77
Born in U.S.	–0.1356 ***	–2.73
U.S. Citizen	0.0366	1.09
Constant	0.5889	13.67
N	144	
R^2	0.20	

* significant at 10% level ** significant at 5% level *** significant at 1% level

unusual for drivers to take unsafe chassis on the road. Half of the drivers in the sample stated that they had been offered an unsafe chassis in the thirty days prior to the survey.

Drivers in the survey were asked what they had done the most recent time they had been offered an unsafe chassis. Twenty-two percent reported that they had taken the chassis on the road. A probit model is developed to assess the correlates of taking an unsafe chassis on the road. The specification follows that of previous models. Controls are included for race and ethnicity, tenure and experience, and firm size. Daily pay, truck ownership, and a dummy variable for a moving violation are also included as explanatory variables.

It is not clear, a priori, whether race or ethnicity would increase or decrease the likelihood of taking an unsafe chassis on the road. The signs of tenure and experience are also not clear. It could be the case that drivers with more experience are more risk averse and thus would be reluctant to accept an unsafe chassis. It might also be that drivers with more experience feel that their skills could compensate for an unsafe chassis, thereby increasing the likelihood of acceptance.

A measure of daily pay is included to capture whether those who earn more are more likely to accept an unroadable chassis. A dummy variable is included that takes a value of one if the driver owns his/her truck (81.6 percent of the sample). The sign of this coefficient is also indeterminate a priori. Owners of trucks might be more risk averse, decreasing the likelihood of accepting an unsafe chassis, which places their capital (truck) investment at risk. However,

they also might be under more economic pressure, thereby increasing the likelihood of accepting an unsafe chassis. Finally, a dummy variable is included that takes a value of one if the driver had received a moving violation in the last twelve months (51.5 percent of the sample). The coefficient on this variable is expected to be positive. Speeding is a proxy for risk preference among drivers. It is also likely the case that drivers who admit to receiving a moving violation might also be more comfortable admitting that they took an unsafe chassis on the road.

The model is a nonlinear probit estimation (a logit estimation exhibited similar results), and the coefficients presented are the derivatives, evaluated at the mean, which approximate marginal effects. Most coefficients are not significant—it appears that race, ethnicity, experience, and tenure do not affect the probability of taking an unsafe chassis on the road (see table 3; some racial dummies were dropped due to perfect prediction). Pay per day is insignificant. Though it is possible that this variable is endogenous, using a two-stage approach does not alter the results.

Drivers at firms with 100–249 drivers are more likely (0.23) to take an unsafe chassis on the road than are drivers at small firms. Drivers who report receiving a moving violation are 0.09 more likely to report taking an unsafe chassis on the road. This is undoubtedly a combination of risk-taking behavior and the willingness to report such behavior in a survey. Finally, drivers who own their truck are more likely (0.10) to report driving with an unsafe chassis. This is likely picking up the "economic pressure" effect previously hypothesized.

TABLE 3
Chassis Probit

	dF/dx	*z* statistic
Experience	0.0036	1.09
Tenure	–0.0002	–0.04
Firm Size: 25–99	0.0256	0.45
Firm Size: 100–249	0.2311 **	1.97
Firm Size: 250+	0.1183	0.85
Hispanic	0.0457	0.67
Pay Per Day	–0.00009	–0.47
Own Truck	0.1010 *	1.65
Moving Violation	0.0942 *	1.91
N	151	
Pseudo R^2	0.15	

* significant at 10% level ** significant at 5% level *** significant at 1% level

Conclusion

Drivers at the Ports of Los Angeles and Long Beach are critical to goods movement within southern California and provide a key link to trade between the region and the rest of the country. The driver survey conducted at the Port of Long Beach provides insight into the wages and working conditions of these drivers, most of whom are owner-operators and many of whom are not native to the United States.

These self-employed drivers bear the risk of fluctuations in diesel prices, insurance costs, and capital expenditure, allowing drayage companies to operate with significantly lower fixed costs. The drivers work long hours (on average 11.2 hours per day) and spend nearly half of their time involved in nondriving work (such as waiting at the ports). Their pay ($29,903), while comparable to national figures on workers with a high school diploma, involves working 33 percent more hours than a typical full-time worker. It is also notable that these drivers are paid substantially lower than the national average for owner-operators and employees. A model of net annual earnings for port drivers finds no returns to education, experience, or tenure.

The pay and work of these drivers raise questions about the way in which this labor force should be utilized to improve port efficiency. Currently delays at the port cause problems for shippers and truckers, while the terminal operators and longshoremen are insulated financially due to high volumes of trade. A model of trucker waiting time finds some preliminary evidence that language (proxied by birthplace) leads to longer hold-ups for drivers at the ports, further lowering their earnings. Given the inability of drivers to collectively bargain, and the apparent inability of port drayage companies to contract for higher rates with ocean carriers, there is little incentive in the current system to use drivers' time more efficiently.

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Appendix A: Descriptive Statistics

Variable		Mean	Standard Deviation
Pay	Gross Annual Income	$50,749.99	$26,790.40
	Net Annual Income	$35,436.73	$60,926.05
	Pay Per Day	$232.12	$172.48
Demographics	Tenure	3.444	3.561
	Experience	8.995	7.378
	Age	41.090	8.683
	Male	98.90%	
	Married	77.71%	
	Separated, Divorced, Widowed	13.38%	
	White	17.83%	
	Black	1.91%	
	Asian	2.55%	
	Native American	3.18%	
	Hispanic	84.71%	
	Born in the U.S.	14.65%	
	U.S. Citizen	54.14%	
	Less than High School	32.48%	
	High School Diploma	30.57%	
	Some College	19.11%	
	Vocational or Technical Degree	12.10%	
	College Degree or Higher	3.18%	
Work Characteristics	Hours Worked Per Day	11.513	4.875
	Trips Per Day	2.845	1.537
	Firm Size Less than 25	21.66%	
	Firm Size between 25 and 99	56.69%	
	Firm Size between 100 and 249	8.92%	
	Firm Size 250 or more	10.83%	