

APPENDICES

Appendix A Selected San Francisco policies relating to pay, benefits and labor standards

Policy	Jurisdiction and Effective Date	Applies to	Conditions
Equal Benefits Ordinance	City and County, June 1997	City contracts for public works, concessions, leases, goods and services.	Prohibits entering into any contracts with an entity that discriminates in the provision of benefits between domestic partners and spouses.
Card Check Ordinance	City and County, January 1998	Hotel and restaurant developments where the City has a proprietary interest.	Employers must agree to abide by card-check procedures for determining employer preference on the subject of labor representation.
Displaced Worker Protection Act	City and County, May 1998	Janitorial, security and building maintenance contracts. *	Retention of employees for a minimum of 90 days when a successor contract is awarded.
Prevailing Wage for Janitors	City and County, May 1999	City janitorial contracts.	Requires payment of prevailing rate of wages including benefits or the matching equivalent.
Quality Standards Program	SFO Airline Service Firms, April 2000 Skycaps, Wheelchair Agents, June 2000 Airlines, Oct. 2000	Employers with workers in security areas or performing security functions at SFO.	\$9 an hour minimum compensation with benefits; \$10.50 an hour without; increased to \$10/\$11.50 in January 2001; adjusted annually thereafter by the Bay Area CPI.
Labor Peace/Card Check	SFO, February 2000	SFO Employers not covered by the Railway Labor Act.	Requires employers to follow card check agreements for union recognition.
Minimum Compensation Ordinance (Living Wage)	City and County, October 2000 Redevelopment Agency, October 2001	Condition on City Service Contracts, In-Home Support Service Public Authority, and SFO Property Contracts.	Requires employers to pay a minimum of \$9 an hour increasing to \$10, January 2002; provide 12 paid days off annually.

Policy	Jurisdiction and Effective Date	Applies to	Conditions
Worker Retention Policy	SFO, June 2001	Third party contractors covered by the QSP and certain airport contracts.	Retention of employees for a minimum of 90 days when a successor contract is awarded.
Health Care Accountability Ordinance	City and County, July 2001 Redevelopment Agency, Oct. 2001	Condition on City Service Contracts and Property Contracts including SFO.	Requires employers to provide health benefits or pay \$1.50 per worker hour into a city fund for the uninsured.

Source: San Francisco Board of Supervisors and SFO Airport Commission web sites.

Note: *Applies to all contracts where the primary place of employment is in the City of San Francisco, not restricted to contracts by the City

Appendix B Living wage ordinances in California as of January 2002

City	Date passed	Wage/Benefit levels	Coverage/Thresholds	Labor relations provisions
Berkeley and Berkeley Marina	June 2000 Amended October 2000	\$9.75 with benefits. \$11.37 without. May be adjusted by Council.	City employees. Service contracts: \$25,000. Non-profits: \$100,000. Subsidy recipients: \$100,000. Property contracts. All businesses in Marina Zone with \$350,000 in annual gross receipts.	Anti-retaliation.
Hayward	March 1999	\$8.61 with benefits. \$9.95 without.	Service contracts: \$25,000 Municipal employees.	Anti-retaliation. Collective bargaining supersession.
Los Angeles	March 1997 Amended 1998	\$7.72 with benefits. \$8.97 without. Indexed to city employee retirement benefits. 12 paid days off.	Service contracts: \$25,000. Subsidies: \$1 million. Property contracts.	Anti-retaliation language. Collective bargaining supersession. Worker retention (separate ordinance).
Los Angeles County	June 1999	\$8.32 with benefits. \$9.46 without.	Service contracts: \$25,000.	Collective bargaining supersession. Worker retention. No public funds for anti-union activities. Restricts use of part time workers.
Oakland	March 1998	\$9.13 with benefits. \$10.50 without. Indexed to CPI. 12 paid days off.	Service contracts: \$25,000. Subsidies: \$100,000. Property contracts.	
Pasadena	September 1998	\$7.25 with benefits. \$8.59 without. \$9.00 for temp. agencies.	Municipal employees. Service contracts: \$25,000.	Non-retaliation. Collective bargaining supersession.
Richmond	October 2001	\$11.42 with benefits. \$12.92 without.	Service contracts: \$25,000. Non-profits: \$100,000. Municipal employees. Property contracts.	
San Fernando	April 2000	\$7.25 with benefits. \$8.50 without. 6 paid days off.	Service contracts: \$25,000. Subsidies: \$25,000	

City	Date passed	Wage/Benefit levels	Coverage/Thresholds	Labor relations provisions
San Francisco Living wage	August 2000	\$10 Annual increase of 2.5 percent through 2003. 12 paid days off.	For-profit service contracts: \$25,000. Non-profit contracts: \$50,000. Airport property contracts. In Home Support Services Public Authority.	Anti-retaliation language. Collective bargaining supersession.
Health Care Account-ability	June 2001	Employer must provide health benefits that meet standards or pay \$1.50 an hour into a fund for the uninsured.	For-profit Service contracts: \$25,000. Non-profit contracts: \$50,000. Property contracts.	Anti-retaliation language.
Redevelopment Agency	October 2001	\$10.00 Annual increase of 2.5 percent through 2003 Employer must provide health benefits or pay into a city fund. 12 paid days off.	For-profit service contracts: \$25,000. Non-profit contracts: \$50,000. Property contracts.	Anti-retaliation language. Collective bargaining supersession.
San Francisco Airport- QSP	January 2000	\$10.45 with benefits. \$11.70 without benefits.	Workers whose performance affects safety or security.	Labor Peace/Card Check (separate regulation).
San Jose	November 1998	\$10.10 with benefits. \$11.35 without. Indexed.	Service contracts: \$20,000. Direct grants: \$100,000.	Labor peace. Worker retention. Collective bargaining supersession.
Santa Clara County	September 1995	\$10 with benefits.	Subsidies.	
Santa Cruz	October 2000	\$11 with benefits. \$12 without benefits. Annual adjustment considered by City Council.	City employees. Service contracts: \$10,000.	Anti-retaliation. Cannot use city funds for anti-union activity. Labor peace for city temporary workers.
Santa Monica	May 2000	\$10.50 with benefits. \$13.00 without. 10 paid days off.	Service contracts. Employers within the Coastal Zone with more than \$5 million in annual gross receipts and 50 employees.	Anti-retaliation.
Ventura County	May 2001	\$8 with benefits. \$10 without.	Service contracts: \$25,000.	Collective bargaining supersession.
West Hollywood	October 1997	\$7.25 with benefits. \$8.50 without.		

Sources: ACORN Living Wage Resource Center; Employment Policies Institute, www.epionline.org/livingwage

Notes: Property contracts – places wage conditions on leases of public property.

Collective bargaining supersession – provisions may be set aside in a collective bargaining agreement.

Anti-retaliation – prohibits retaliating against workers for reporting violations or in other ways exercising rights under the ordinances.

Appendix C Methods and data sources

We follow a standard methodology in this study, comparing employment and working conditions at SFO before and after the implementation of the Quality Standards Program in order to isolate as best we can the impacts of the program. In an ideal laboratory experiment, the researcher can say with confidence that very little else besides the intervention changed, or that the effects of this change could be completely discounted by comparison with a control group. In a real world situation, we have to make numerous comparisons that are as closely controlled as possible.

One approach that we use to estimate the impacts of the QSP involves comparing firms in which the program had a small impact to those in which it had a large impact. This approach takes into account the other developments for workers at SFO in the period 1998-2001, such as the changes in passenger volume, the opening of the new International Terminal, improvements in management-labor relations and the overall strength of the national and regional economy.

This comparison distinguishes the firms in which wage costs rose by a high proportion due to the QSP from those with lower impacts.¹ These methods create comparison groups that permit controlling for effects that are not directly related to the QSP. Table C.1 indicates the sector of the low and high impact firms.

Table C.1 High and low QSP impacts, by sector

	Airlines	Airline services	Concessions	Total
Low impact	29.6	18.5	51.9	100.0
High impact	16.7	83.3	0.0	100.0
Total	27.3	30.3	42.4	100.0

Source: UCB-SFO Employer Survey, 2001, conducted by the authors.

Note: Figures are percentages of firms. A high impact firm is defined to be one in which the QSP resulted in at least a 10 percent increase in wages and benefits.

Our research was further complicated by a series of factors, not the least being the aftermath of September 11. Following September 11, large numbers of airport workers were laid off, airlines cut back their flights, state and federal agencies became directly involved in airport security, and the Bay Area economy continued to lead the national economy in a recession. In short, a great deal changed, and while we may speculate that the improved labor-management climate at SFO softened the impact of this shock it was difficult for us to continue tracing the impacts of the QSP beyond this date.

¹ We also experimented with other ways to distinguish high impact firms, such as estimating the proportion of employees that experienced wage increases as a result of the QSP. Such alternative methods did not change the findings.

Even before September 11, employment conditions at SFO were undergoing a series of changes not directly related to the QSP and its implementation. We have been able to control for some of these factors. For example, our primary pre- and post-QSP employment comparisons are between June 1998 and June 2001; both dates reflect summer peak-period employment. Where appropriate, we indicate how they are indirectly related to the QSP. For example, overall employment at SFO did increase following the opening of the new International Terminal.

The closeness in time between the opening of the terminal and the QSP agreement is no accident. The QSP was, in part, an agreement designed to ensure labor peace during the expansion phase. Similarly, the multi-union organizing drive at SFO both contributed to, and was promoted by, the QSP.

To address these complications we have collected data from a variety of sources and used standard triangulation methods to increase our confidence in the findings (triangulation involves comparing the findings obtained from a variety of data sources). In the remainder of this section we describe the data sources used in this study.

C.1 Pre-QSP employment data

The pre-QSP data for this study refers to mid-1998 for employment and mid-1999 for pay. We collected this occupation- and employer-specific wage data for a previous study conducted by the authors (Reich and Hall 1999). For this database, the Airport Commission's 1993 and 1998 Economic Impact Report provided an initial baseline.

To determine the number of covered workers who would be directly or indirectly affected by the then-proposed Living Wage Ordinance, we collected wage data by detailed occupation and tenure class. Our sources also included prior research conducted by the Center for Labor Research and Education at UC Berkeley, which had collected employment and wage data in various airport jobs.

We updated and checked wage information to June 1999 using job postings from the airport employment website, through personal interviews of tenant employees at the airport, and through follow-up telephone calls with the human resource departments of the tenant employers and union officials. We also used occupational wage data from the Bureau of Labor Statistics to complete the wage estimates in a small number of cases.

C.2 Post-QSP Employment Data

The airport phased in the QSP during the period April 1, 2000 to October 1, 2000 and the majority of covered employees received their pay increases after June 1, 2000. In the summer of 2001 (June to August) we conducted a survey of employers to generate a post-QSP employment and wages database comparable with the pre-QSP data. We also used this survey to ask evaluation questions that allowed employers to reflect on the implementation of the QSP.

To this data we added a series of additional data sources used mainly to corroborate (triangulate) the results of the employer survey. These included structured interviews with workers and semi-structured interviews with union activists, and analysis of secondary data collected from the SFO Badge Office, the FAA public access security violations database, the airport employment office and newspapers.

The Employer Survey

The purpose of the employer survey was to determine the post-QSP employment and wages profile for non-management workers at SFO in firms actually or potentially covered by the QSP and MCO. To do this we conducted a mail survey of employers as identified from the list of tenants and airline services contractors supplied to us by SFO Administration. (See Table C.2.) From the initial list we were able to identify 151 firms. This list included all airport tenants, airlines (passenger, cargo or charter), and firms providing services to airlines or the Airport Administration, and concession-holders. It did not include construction firms or firms providing professional or consulting services.

We called each of these firms to confirm that they were tenants of the airport, or that they had employees who were potentially or actually covered by the MCO or QSP. Those potentially covered by the QSP included all employees requiring security badges issued by the SFO Badge Office, while those potentially covered by the MCO included all firms that were tenants of the Airport Commission. We removed 9 firms that had ceased operating at SFO or that were divisions of other firms to be surveyed, leaving 142 firms included in the survey. We label these in Table C.2 as the sampling universe.

We also used the screening call to identify the personnel officer or other person most able to answer the questionnaire. The survey instrument was mailed to this individual. We then followed the mailing with a call to confirm receipt of the questionnaire and to encourage response.

Through the initial call process, we also determined that 22 of these firms did not have non-managerial employees at SFO. We also could not contact or trace 7 firms, leaving us with 113 firms to which we distributed questionnaires.

From these 113 firms, we received outright refusals from 8 firms and no response after repeated reminder calls from 66 firms. We did receive responses from 39, of which 33 had non-managerial employees. The six firms that returned questionnaires indicating that they had no non-managerial employees at SFO mainly were cargo and charter airlines that visit SFO periodically but do not maintain any permanent presence at the airport. The firms that did respond covered the entire spectrum of employer size at SFO, as well as the entire range of friendly to hostile attitudes to the QSP. In the end, we obtained employment information from 34.5 percent of the effective population of SFO firms.

Table C.2 Sample response rates

	Firms	Response rate (percent)
Initial list of firms	151	
Firms no longer in business, or divisions of other firm	(9)	
Universe of firms at SFO	142	
Firms not contactable	(7)	
Firms indicating no employees during screening call	(22)	
Questionnaires distributed	113	100.0
Questionnaires not returned		
Refusals	8	
No response	66	
Total non-response	74	65.5
Questionnaires returned		
Firms with employees	33	
Firms with no employees	6	
Total response	39	34.5

The representative character of the responses to the employer survey was confirmed by our analysis of the airport's own badge data. As we discuss in the next section, our employer survey and the badge data generated similar employment estimates.

Given the dominant presence of United Airlines due to its central maintenance base at SFO, and the individual characteristics of this company, we treated the firm differently for survey purposes. United Airlines is an almost completely unionized firm with low levels of turnover, full benefits, and pay scales that extend above the minimum wage levels in the QSP and MCO. Thus, we did not attempt to collect data on the large number of mechanics and other ground-based personnel stationed at SFO. Instead, we collected data separately from the three divisions (customer service, cabin cleaning and ramp/baggage) most directly affected by the QSP and MCO. A small number of administrative employees outside these divisions temporarily received raises as a result of the QSP, but these increases were soon surpassed by increases from within the company.

For analysis purposes we weighted the responses from each firm to derive an estimate for all SFO employers. The weight factor was calculated as the inverse of the proportion of the firms actually surveyed (regardless of whether they have employees or not), in each of seven categories of firm. The seven categories of firm and the sampled proportion are listed in Table C.3 below. Note that we regarded United Airlines as one firm in its own category since employment in this firm dominates employment in all other airlines at SFO. We surveyed all the screening and skycap firms at SFO, and thus treated these firms as a separate category for analysis purposes so as not to over-estimate the number of "other airline services" employees.

Table C.3 Weights for employer survey

Firm category	Total firms at SFO	Surveyed firms	Weight
United Airlines	1	1	1.00
Cargo/Charter airlines	29	21	1.38
Passenger airlines	38	17	2.24
Car rental	8	1	8.00
Concessions	24	6	4.00
Screener / Skycap	4	4	1.00
Other airline services	38	11	3.46

Source: UCB-SFO Employer Survey, 2001, conducted by the authors.

We developed the questionnaire for the employer survey from a survey instrument that we had designed and used previously in a survey of firms at the Port of Oakland, including Oakland International Airport (see Zabin, Reich and Hall 2000). The questionnaire consisted of three parts:

- (1) a section to establish the employment and wages by occupation in the firm
- (2) questions on the perceptions of the employer as to the impact of the QSP/MCO on employee performance, and
- (3) questions about the financial response of the firm to the QSP/MCO, including benefits offered and contracting changes.

We tailored the questionnaire slightly for airlines, airline service firms, and concessions respectively, according to whether they were covered by the MCO or QSP, and to provide pre-coded occupational and service/product categories. We then combined the data from each questionnaire variant into a single dataset for analysis purposes.

SFO Badge Data

Every person who works at SFO must wear a security badge. As a result, various personal details are recorded when the individual starts work at SFO and acquires the badge. This requirement applies to all employees, within the terminal buildings and parking garages, including both secure areas (the tarmac, baggage etc) and public areas. It does not, however, include employees of the car rental firms that have their operations some distance from the terminal.

We obtained the complete airport badge database as of June 1, 2001. This database provides an invaluable snapshot of employment at SFO, although as with all such administrative data, the data needs to be interpreted carefully.

The coverage and limitations of the badge data may be summarized as follows:

- (1) For each individual, we were provided the employees' start-date, job description, gender, date of birth, race, employer, and city of residence. Additional identifying information had been removed from the data.

(2) We were given the list of all active badges, which in theory includes only those actually employed. A small portion of the individuals holding these badges was no longer working. Thus, the badge data slightly over-estimates employment levels at SFO.

(3) We were not able to determine termination dates for returned badges and hence could not measure turnover directly with this data. Rather, as described in Appendix D below, we had to infer information on turnover rates by examining job tenure profiles.

(4) Rental car agents were not included in the data. Construction workers, consultants to the airport commission and employees of state, federal and local government agencies were included but could easily be removed for analysis purposes.

(5) Missing data for specific variables was not a serious problem. The database contained 22,064 individuals, with 595 missing job descriptions, 242 missing sexes, 249 missing dates of birth, and 280 missing employers' names. Most of the missing data appears to correspond to non-employees (such as commission members) and short-term contract workers (such as construction workers for the new international terminal).

For each individual, we coded their job description and then matched these job descriptions to 31 occupational classes identified in the firm survey. Similarly, we coded each individual's employer and matched the employer codes to those used in the firm survey. This gave us two ways to compare the badge and firm survey data directly.

First, we could compare the occupation-specific employment numbers from our (unweighted) employer surveys with the same firms as recorded in the badge data. As Table C.4 shows, there are some small discrepancies between these two data sources. As we would expect, the badge data reports slightly larger numbers (approximately 14 percent more) of employees than the survey because not all badges are turned in when employees stop working.

Table C.4 Employment comparisons, selected occupations, survey data and badge data

	Employer survey	Badge data
United Airlines (Ramp, Customer Service and Cabin Cleaners only)	2,607	3,043
Cargo airlines	30	39
Other passenger airlines	854	1,113
Concessions	87	54
Screener/skycap	1,333	1,388
Service	715	810
Total	5,626	6,447

Sources: UCB-SFO Employer Survey, 2001, conducted by the authors and SFO Badge Office Data, 2001.

Note: Table includes only selected occupations. Employer survey data are unweighted.

The only major discrepancy in Table C.4 occurs among United Airlines employees. When we checked the Badge Office data, we found that a large number of United Airlines employees who were ramp workers but worked in United's Air Cargo division. This group was not included in our employer survey, but we had no means of excluding them from the badge data. This item accounts for about half of the difference between the badge and survey data.

Second, we could compare the estimated (or weighted) total employment, as derived from the sample survey of firms, with the total employment of these firms as recorded in the badge data. This comparison, which is presented in Table C.5 below, suggests that our survey data could underestimate the overall number of employees, but by no more than 10 percent. Although the estimated total employment from the weighted survey is about 20 percent below the SFO Badge Office estimate, we noted above that badges not returned and incorrectly classified employees inflated the badge data by approximately 14 percent. The under-estimate results from lower response rates among large employers in the passenger airline sector, the air cargo sector, the concessions and the catering sector. This underestimate does not substantially affect our findings with respect to the impact of the QSP and MCO. In almost all these cases, the firms involved paid wages above the QSP level.

Table C.5 Comparison of employment from firm survey and badge data

	1999 SFO estimate	Badge	Weighted survey	Comments
United Airlines (ramp, customer service, cabin)	2,770	3,043	2,607	Badge data report 350 more ramp workers than the employer survey.
Other passenger airlines	1,045	3,517	2,033	Survey estimate low due to missing some large airlines.
Charter/cargo airlines	240	378	41	Largest employers not surveyed.
Concessions	1,669	1,002	348	Large employers not surveyed.
Service	3,284	3,576	3,803	Cargo/Catering low; security coverage complete.
Car rental	1,038		2,120	Survey includes summer casuals.
Total	9,008	11,516	8,832	Excludes car rental employment.

Sources: SFO Badge Office data, UCB-SFO Employer Survey, 2001, conducted by the authors. Reich and Hall (1999b).

Note: Table includes selected occupations and employers only.

Supplementary data

In addition to the firm survey and badge data discussed above, we obtained additional information from the following sources:

1. *Airport employment office*

We collected information on working conditions, wages and benefits and job descriptions for various occupations from an archive of employment advertisements maintained by the SFO Employment Office. This was used to supplement missing survey data and to trace the timing of increases for specific jobs.

2. *Airline passenger numbers*

SFO officials provided us with data for the period 1998-2000 on the numbers of flights, passengers and cargo by airline for SFO.

3. *Interviews with union organizers*

These interviews consisted of one-hour structured sessions with eleven union organizers and AFL-CIO staff who were involved in the San Francisco Airport Organizing Project. The interviews were designed primarily to corroborate information gathered from the employer and worker surveys, while also examining the QSP from the perspective of organized labor. Each interview included both pre-coded and open-ended questions, and was structured around four sections. In the first section we obtained background information on the firms, numbers of workers in the bargaining unit, the status of organizing, and general changes for the union and its members. In the second section we asked about changes in employer policies. In the third section we asked about the effects of the QSP, labor peace and living wage policies on organizing and collective bargaining. In the final section we asked open-ended questions about general lessons from the organizing drive.

Labor organizations represented by those interviewed for the study included the SFO Organizing Project; Service Employees International Union (Local 790); Office of Professional Employees International Union (Local 3); International Brotherhood of Teamsters (Local 665); International Association of Machinists, Automotive Trades (Local 1414 and District Lodge 190); United Food and Commercial Workers (Local 101); San Mateo Central Labor Council; and the AFL-CIO Western Region.

4. *Surveys of workers*

These surveys consisted of a brief, two-page self-completion questionnaire designed to complement our other data sources. The surveys were administered at SFO on three different days, once before September 11 and twice following September 11. In the end, we obtained 103 completed questionnaires. The respondents included workers in most of the low-wage jobs, with over-representation of security workers and those with longer tenure. Union organizers assisted with recruiting the survey participants and we obtained cooperation from employers.

The worker survey questionnaire consists of three sections. In the first section, we obtained basic information about the employer, the worker's job tenure and hourly wage, as well as their perceptions about changes in the workplace environment before and after implementation of the

QSP. These items included questions about skill requirements, effort required on the job, level of stress on the job, pace of work, and training provided by the employer.

The second section asked the worker for information on health benefits. We asked whether or not the employer offers health insurance, whether or not the worker is covered by this insurance, and how much he or she pays for the insurance. We also attempted to ascertain any changes in employer-provided insurance coverage before and after QSP implementation.

Finally, we asked a series of basic demographic questions, including age and gender. We also asked a series of questions attempting to capture changes in various quality of life variables, including changes in hours worked, time spent with family, housing, vacation time, health, and personal financial savings. The survey concluded with a few questions about union membership.

Initially, we had hoped to interview several entire shifts in order to obtain a representative sample, but such a goal was not always possible. Despite this limitation, we did obtain a sample that we consider to provide a useful and valid comparison with our other larger datasets. Table C.6 provides a summary of hourly wages (post-QSP implementation) for this sample. Note that the standard deviations are quite low, suggesting that the wage information is relatively accurate. This uniformity constitutes a check of the internal validity of the data.

Table C.6 Worker survey: wage rates by job categories

	Mean	Standard deviation	Frequency
Customer service, check-in	11.5	1.8	12
Baggage/ramp/exit guard	10.1	0.4	12
Cabin cleaner	11.4	0.1	5
Security (screeners/skycaps)	10.0	0.2	40
Other QSP	9.9	0.9	8
Non-QSP	9.4	1.6	22
Totals	10.1	1.2	99

Source: SFO Worker survey, 2001, conducted by the authors.

Note: Total number of respondents = 99.

Appendix D Tenure analysis using SFO Badge Office data

The badge data provides us with an opportunity to analyze the length of time that SFO employees have been in their current job. However, the data only provide a snapshot of a particular moment in time. Moreover, the snapshot only contains information about the people who are still on the job, and not about those who have already left.

By making some reasonable assumptions we can utilize the detail in the badge dataset to construct a series of snapshots that illustrate dynamics over time. In particular, we find that the QSP did have some positive effects on the rate at which SFO workers needed to be replaced. A lower rate of replacement for QSP-covered positions indicates reduced turnover and/or lower employment growth. Since we know that airport employment increased in the period leading up to June 2001, we can eliminate the slower growth explanation. Consequently, our analyses of the badge data are consistent with our findings from the employer survey that turnover rates did indeed fall in response to the QSP program.

D.1 Tenure at SFO

All else equal, employees generally stay longer in jobs that pay better and that offer career advancement opportunities. This pattern can be seen in Table D.1. Employees in clerical, mechanical and cabin cleaner positions have longer tenure on average than employees in lower-paying positions, such as wheelchair attendants, cashiers and screeners.

Table D.1 Average tenure of SFO workers, by occupation

Occupation	Years in current position	Standard deviation	Total number
Customer service agents	4.4	4.1	3,100
Administration/ clerical workers	5.2	4.4	712
Baggage/ ramp agents	4.9	4.4	2,880
Mechanics	6.0	4.4	2,518
Cabin cleaners	5.3	4.7	1,097
Screeners	3.8	3.9	1,463
Skycaps	4.2	4.7	197
Wheelchair attendants	2.7	1.6	100
Fuelers	5.0	4.4	91
Shelvers/ storekeepers	4.2	4.1	696
Snack bar cashiers	4.9	4.4	327
Cashiers	3.4	3.3	505
Total	4.7	4.3	17,547

Source: Authors' analysis of SFO Badge Data, 2001.

Note: Includes all employees in firms and occupations covered by firm survey, including United Airlines.

However, at SFO tenure varies considerably among different employers and different groups of employees. This variation is reflected in the high standard deviations associated with each of these occupations. For this reason we examine the distribution of tenure within different occupations. This pattern is presented in Table D.2. For example, two-fifths of all employees at SFO have been in their current position less than two years and over half of all screeners have been in their current position less than two years. The administration, ramp and cleaner occupations all have a considerable proportion of workers with long tenure of over five years.

Table D.2 Distribution of tenure in selected occupations

Tenure (years)	Customer service	Administration/ Clerical	Baggage /Ramp	Cabin Cleaner	Screener	All occupations
0-.5	13.5	5.9	15.2	8.6	16.0	13.2
.5 – 1.0	10.8	4.4	10.4	13.2	16.9	12.0
1- 2	13.5	18.0	12.0	16.0	20.3	14.9
2- 3	10.5	13.2	9.3	9.7	11.5	10.3
3- 4	11.0	8.6	6.5	7.2	8.0	8.0
4- 5	7.6	4.4	6.6	4.2	8.7	6.4
5- 10	16.0	20.4	18.5	17.0	13.0	16.7
10 +	17.0	25.2	21.5	23.7	5.6	18.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' analysis of SFO Badge Data, 2001.

Note: 1. Includes all employees in firms and occupations covered by firm survey, including United Airlines.
2. All figures in percentages.

In the remainder of this appendix, we analyze how the QSP influenced tenure patterns and other improvements in working conditions at SFO.

D.2 Analysis of the Badge Office data

The Badge Office data tell us how long each currently employed individual has been working in their current position at SFO. Working backwards, we can count the number of people still working at SFO who were working there a month ago, two months ago, and so forth. For example, 11,515 people were working in the occupations and firms that formed the population for our survey. Of these, 5,720 were working at SFO in the same job three years ago. (This does not mean that total employment was 5,720 three years ago.)

Using these two data points, we can estimate is the rate at which employees were added to the current pool in the intervening years – what can be called a replacement rate, estimated with the following formula:

$$\text{Monthly Replacement Rate} = 1 - \sqrt[n]{\frac{\text{Employment 3 Years Ago}}{\text{Employment Today}}}$$

where n is the number of months (i.e., 36).

This expression is similar to that of a decay rate or quit rate. We call it the replacement rate to distinguish it from the more common meaning of the quit rate. A higher replacement rate implies that employees are being replaced more rapidly, which we take as an indicator of higher turnover (or growth – we address this issue below).

We expect the replacement rate to be higher when we compare the rate for some period ending today, as compared to some period ending six months or a year ago. This is because employees are more likely to leave a job in the first few months. By calculating the replacement rate for different firms, different occupations and for different time periods, and by comparing these replacement rates, we can develop some insights into the impact of policy changes on tenure.

D.3 Basic Results

We estimated the replacement rate over three-year periods. Thus, in Table D.3 through D.6 below, the first row refers to the replacement rate for the period May 1998 to May 2001, while the last row refers to the replacement rate for the period May 1996 to May 1999.

Table D.3 compares the replacement rate by sector and indicates the following:

1. The replacement rate varies considerable by sector – it is highest for airline services (check-in, baggage, fueling, catering subcontractors) and screeners. It is lowest for United Airlines, the employer that offers some of the best long-term career opportunities at SFO.
2. As is to be expected, the replacement rate increases overall for the most recent periods (from 19.1 percent to 25.7 percent for all sectors). For United Airlines, however, the replacement rate trends downwards. As it turns out, by May 2001 many United employees were staying on the job longer since at that time they had been waiting a year for a new contract to be signed. According to a United Airlines personnel officer, employees were expecting to receive back pay in the new contract.
3. The most interesting result concerns the decrease in the replacement rate for screeners/skycaps in the period following the implementation of the QSP. (In Table D.3, compare the 42.7 percent replacement rate in the period leading up to November 2000 with the 41.4 percent replacement rate in the period leading up to May 2001.) That the replacement rate did not rise in this period suggests a positive impact of policy upon employee retention.

Table D.3 Annual sectoral replacement rates at SFO

Three years ending	United Airlines	Cargo airlines	Passenger airlines	Concessions	Screeener/ Skycap	Airline services	All sectors
May-01	14.5	33.6	22.3	24.2	41.4	48.0	25.7
Nov-00	14.7	35.4	19.9	23.6	42.7	39.3	23.5
May-00	15.4	33.5	16.4	19.7	40.6	34.6	21.2
Nov-99	17.6	29.3	15.1	17.6	38.4	30.4	20.3
May-99	18.6	26.0	13.3	17.7	37.0	25.9	19.1

Source: Authors' analysis of SFO Badge Data, 2001.

- Notes: 1. Includes all employees in firms and occupations covered by firm survey.
2. All figures in percents.

When we examine the replacement rate by occupation, we find as expected that the lowest wage occupations (Screeners, wheelchair attendants and ramp agents) have the highest replacement rates. Tables D.3 and D.4 also indicate that while the replacement rate overall did increase, it fell considerably for wheelchair attendants. Note that these tables exclude United Airlines employees, whom we address in Table D.5 below.

Table D.4 Annual occupational replacement rates at SFO

	Customer service	Baggage / Ramp	Cabin cleaner	Screeener	Skycap	Wheelchair attendant	Cashier	All occupations
May-01	31.2	39.3	44.3	40.1	10.1	40.1	30.5	25.7
Nov-00	28.0	30.9	45.5	39.2	10.9	55.1	30.9	23.5
May-00	23.5	25.8	44.7	33.9	14.9	64.2	28.1	21.2
Nov-99	21.5	21.6	43.2	33.3	11.6	71.7	33.9	20.3
May-99	18.6	17.5	36.6	34.9	9.4	149.0	32.3	19.1

Source: Authors' analysis of SFO Badge Data, 2001.

- Notes: 1. Includes all employees in firms and occupations covered by firm survey, excluding United Airlines. Total column includes United Airlines employees in surveyed occupations.
2. All figures in percents.

We can also compare the replacement rate for occupations in different firms. One such comparison is among employees of United Airlines and other firms for three low-wage occupations, customer service, ramp/baggage and cabin cleaners. Here we find that United Airlines has substantially lower replacement rates than other employers.

Table D.5 Annual replacement rate by employer and occupation

	Customer service		Baggage/ Ramp		Cabin cleaner	
	United	All other employers	United	All other employers	United	All other employers
May-01	15.7	31.2	12.0	39.3	16.2	44.3
Nov-00	15.9	28.0	12.4	30.9	16.3	45.5
May-00	21.5	23.5	11.2	25.8	12.5	44.7
Nov-99	26.2	21.5	13.9	21.6	9.3	43.2
May-99	28.7	18.6	14.9	17.5	9.0	36.6

Source: Authors' analysis of SFO Badge Data, 2001.

- Notes: 1. Includes all employees in firms and occupations covered by firm survey.
2. All figures are percentages.

D.4 Results after controlling for growth effects

Changes in replacement rates might partly be the results of growth or decline in the level of employment. When employment is growing, the replacement rate would be higher. We know that the overall level of employment at SFO rose in the period leading up to June 2001, and so we regard constant or declining replacement rates as evidence of reduced turnover.

One method to control for such growth effects assumes that the various occupations are growing/declining at the same rate across the entire airport. We then compare the replacement rates of different occupations to the replacement rate overall. This essentially is a first-difference calculation.

We conducted this analysis by occupation rather than by firm or sector. In Table D.6, the Difference columns represent the first difference between the *monthly* replacement rate for the occupation and for all workers in the survey population (last column). A positive difference indicates a higher than average replacement rate.

The table provides evidence of the effect of the QSP in reducing turnover rates. The difference between the replacement rate for Customer Service, Wheelchair and Cashier occupations all decreased towards that for all occupations. This trend was especially notable in the case of the wheelchair attendants. Among screeners, the trend is mixed, but generally indicates an improvement. For cabin cleaners and baggage handlers, there is no discernable change. In both of these jobs the replacement rate was, and remained, below that for all jobs.

Table D.6. Monthly occupational replacement rates and first differences

	Customer service		Baggage / Ramp		Cabin cleaner		Screener		Wheelchair attendant		Cashier		All occupations
	Rate	Difference	Rate	Difference	Rate	Difference	Rate	Difference	Rate	Difference	Rate	Difference	Rate
May-01	1.8	-0.1	1.7	-0.1	1.7	-0.1	2.8	0.9	2.8	0.9	2.2	0.3	1.9
Nov-00	1.6	-0.0	1.4	-0.2	1.7	-0.0	2.7	1.0	3.7	1.9	2.2	0.4	1.7
May-00	1.7	0.1	1.2	-0.3	1.5	-0.0	2.4	0.8	4.2	2.6	2.0	0.4	1.6
Nov-99	1.7	0.2	1.3	-0.2	1.3	-0.2	2.4	0.8	4.6	3.0	2.4	0.9	1.5
May-99	1.7	0.2	1.2	-0.2	1.1	-0.3	2.5	1.1	7.9	6.4	2.3	0.8	1.4

Source: Authors' analysis of SFO Badge Data, 2001.

Note: Includes all employees in firms and occupations covered by firm survey, including United Airlines.

We get slightly different results when we exclude United Airlines employees. Table D.7 shows the first difference between the implied occupation-specific and overall annual percentage replacement rate when we exclude the United Airlines employees. The replacement rate for cabin cleaners did fall, but they rose for the ramp workers. There is no discernable trend for customer service employees. The positive effects on turnover for customer service jobs noted above thus probably has more to do with the fall in turnover in United Airlines, than to the effects of the QSP.

Table D.7 Changes in annual replacement rates for specific occupations, excluding United

Three years to...	Customer service	Baggage / Ramp	Cabin cleaner
May-01	0.2	8.3	13.3
Nov-00	0.1	3.0	17.6
May-00	-0.6	1.8	20.7
Nov-99	-0.2	0.0	21.6
May-99	-0.7	-1.8	17.3

Source: Authors' analysis of SFO Badge Data, 2001.

Note: Includes employees in firms and occupations covered by firm survey, excluding United Airlines.

In sum, our analysis suggests that there were indeed positive turnover effects associated with the QSP. These turnover reductions were most concentrated on the wheelchair and screener occupations, and to a lesser extent for customer service occupations, and they were strongest in the Airline service sector.

Appendix E Living wage policies and union organizing campaigns at SFO

San Francisco Airport provides an important case study of the relationships between living wage campaigns and policies and union organizing efforts. The San Francisco policies were passed in the context of the SFO Organizing Project, a multi-union organizing drive at the airport that involved ten union locals and the San Mateo and San Francisco Labor Councils. To establish this coalition, the participating unions developed common prior agreements on resources and organizing jurisdictions at the airport. The AFL-CIO and the locals contributed staff. Between the start of the organizing drive in early 2000 and the end of 2001, about 2,400 workers in 21 firms gained union recognition and nearly 2,000 workers in twelve firms had collective bargaining agreements.

The living wage policy was nonetheless controversial among the participating unions. Several of the unions in the organizing drive were at the core of the living wage campaign. But others argued that if the law set a common wage floor, workers would have less incentive to join a union. Another argument made against unions taking up living wage campaigns concerned opportunity costs: that the time spent in what can become long, drawn-out battles, with sometimes difficult coalition partners, would be better spent directly on organizing workers.

In the course of this study, we interviewed organizers from the organizing project staff, the participating unions, and several workers who played leadership roles in the organizing. The organizers that we interviewed all reported that the living wage campaign had provided moderate to strong assistance to labor organizing. Of the ten union locals involved in the SFO Organizing Project, four played a direct role in the living wage campaign. Those organizing in firms covered by the QSP also all reported that it provided moderate to strong organizing assistance.

Organizers reported that at its best the living wage campaign provided an initial context for organizing. The campaign served to identify and develop a small core of leaders, create contact lists, and educate workers and public officials. Worker contacts made by living wage organizers were highest among baggage screeners, skycaps, retail workers and security guards—many began wearing living wage buttons on the job. A small group of airport workers took on direct leadership roles in the campaign: planning actions, lobbying members of the Board of Supervisors and Airport officials, doing media interviews and talking to their co-workers.

Importantly, the campaign and policies opened the space for workers to talk among themselves about wages and working conditions. Workers involved in the effort reported that it “got us communicating with each other, raising common interests. It showed we had the collective ability to make change in the workplace.” The greatest worker involvement occurred among the skycaps and wheelchair agents, who led an ultimately successful fight with the Airport Commission over including tipped workers in the QSP.

The SFO Organizing Project concentrated its initial efforts on the larger employers that were covered by the QSP. The organizing drive started with an education campaign for the workers on the new policy. Forty organizers, new leaders and union activists made contacts with workers over a two-day period in March 2000. As a part of the outreach effort, organizers informed the

workers that they would be receiving a raise, and explained the role of the unions in creating the program.

Fears that the Quality Standards Program would remove a reason for workers to join unions were not borne out during the initial phase of organizing. Organizers reported relatively few workers questioning the need for a union now that they had a raise. Issues related to working conditions, seniority, favoritism and voice on the job continued to provide compelling reasons to join a union.

Of the firms that were covered by the QSP and by the Labor Peace policies, six had workers who were involved in the living wage campaign or had contact with union organizers prior to passage of the QSP. The organizing drives in each of these firms resulted in collective bargaining agreements. These firms represent 55 percent of the workers that were organized through the project.

At five firms that were covered by the QSP, significant worker contact by organizers began after the QSP was implemented. According to the organizers, if the union had not made an early education campaign at a job site, the workers initially tended to credit the city or the employer for the raise. However, information spread quickly across companies in the relatively closed environment of the airport. Filipino and Latino workers were more likely than those in other ethnic groups to have heard about the QSP from friends or family working in other airport positions.

Two firms in this group abided by the labor peace/card check policy, and at both collective bargaining agreements resulted. Three of these firms challenged the labor peace/card check rule. None of them reached collective bargaining agreements. In two of these three cases the unions abandoned the organizing drive after losing legal actions, or determining that they would lose. In the final case, the union planned an NLRB election in spring 2002, two years after the QSP went into effect, but abandoned the plans when they realized that they did not have the votes to win.

Ten airport concessionaires were organized during the same period. All of these firms are potentially covered under the living wage policies. None provided the mandated wage increases prior to the union organizing drive, although employers had gone some of the way to match the raises in order to compete for employees. In one case, the workers petitioned the management to pay them the living wage amount, even though the company was not yet obligated to do so by law. When the employer refused, the workers went to the union for help. All of the firms were covered by the labor peace/card check rule; all eventually agreed to union recognition, and all had made substantial progress towards collective bargaining agreements.

As current union principles would anticipate, the labor peace/card check rule was a common factor in all of the successful organizing drives. The three campaigns without the card check rule in effect were eventually abandoned. The living wage policies appear to have provided the greatest benefits to organizing when workers were directly involved in the campaign and worker contact was made in advance of implementation of the policies. Where a long period of time elapsed between the mandated raises and the initial worker contract, the policies may have had a slight negative effect on organizing.

The living wage campaign and subsequent policies served in other ways to create a positive organizing climate. Public support for the organizing drive from religious leaders and city officials helped build worker confidence in joining a union, while discouraging employer resistance.

The experience at SFO demonstrates how living wage policies and the campaigns to achieve them can be useful tools for union organizing. Zabin (1999) argues, drawing especially on the Los Angeles case, that the efficacy of the tools depends on whether there is a deliberate plan to make use of them. How living wage campaigns affect organizing depends importantly upon the level of worker participation in the campaign and the degree to which workers view the policies as gifts from the government or employer, or as coming from the union and their own efforts.

Table E.1. Union recognition at SFO, April 2000-December 2001

Employer	Unit	Union	Unit size
Argenbright	Safety and Security	SEIU 790 & IBT 665	350
Globe	Safety, Security, Skycaps and Bag handlers	SEIU 790 & IBT 665	135
ITS	Safety, Security, Skycaps and Bag handlers	SEIU 790 & IBT 665	800
Pacific States Airline Services	Skycaps	IBT 665	24
Premium Services Management	Skycaps	IBT 665	33
SmarteCarte	Concessionaire	IBT 665	75
Polaris Research & Development	Passenger Service	OPEIU 3	32
Swissport	Ramp	IAM 1414	370
Host Marriott Retail	Concessionaire	UFCW 101	70
Wilson's Leather	Concessionaire	UFCW 101	12
Globe Ground North America	Ramp	IAM 1414	85
Pacific State Patrol	Parking Guards	IBT 665	50
Language Management Resources	Passenger Service	OPEIU 3	30
Il Fornaio Caffè Del Mondo	Food and Beverage	HERE 340	
Willow Street Pizza	Food and Beverage	HERE 340	
Café Bouli	Food and Beverage	HERE 340	
Café Metro	Food and Beverage	HERE 340	
Harry Denton's	Food and Beverage	HERE 340	
Harbor Village	Food and Beverage	HERE 340	
Andale Tacqueria	Food and Beverage	HERE 340	20
Lori's Diner	Food and Beverage	HERE 340	16

Source: SFO Organizing Project

Note: The services provided by Language Management Resources and PSAS were suspended by the Airport following September 11.

Appendix F Supplementary material on airport labor markets

F.1 Conventional airport economic impact studies

Airports serve two main functions: they are transportation nodes that provide connections with other places, and they are economic nodes within the regional economy. The interaction between these two functions – in essence how passenger and cargo throughput translate into local employment – are regularly studied in economic impact reports. Such impact studies trace how aviation activities result in a range of employment opportunities.

In addition to pilots and flight attendants, aircraft require a range of ground-based services. These range from highly technical maintenance activities, to relatively low-skilled jobs such as aircraft cleaning. The efficient handling of passengers and cargo requires a range of customer services, facilities and amenities and coordination among diverse firms and workers. All this activity gives rise to jobs that vary considerably with respect to pay, skill levels, training, worker voice and other conditions of employment.

Most airport impact studies are concerned only with estimating aggregate employment and income impacts. For example, SFO's own impact reports on aggregate employment, revenue, personal income and tax impacts without mentioning distributional effects (SFO, 1998). Only a few impact reports examine the education and qualification levels required in the jobs that are created (see for example, Hakfoort, Poot and Rietveld 2001). In this study we are primarily concerned with the quality of the jobs that are created through airport activity, a largely unstudied topic in the existing literature.

F.2 Workforce demographics

The workforce of SFO consists of a diverse group of Bay Area residents, although there are some ethnic and gender divisions in the workforce. This section presents a demographic profile of the ground-based nonsupervisory SFO workers in the study population June 2001, using the SFO Badge Office data. Table F.1 summarizes, by sector, the demographic characteristics of employees at SFO in 2001. Table F.2 summarizes the same information for six selected job titles that account for many of the low-wage ground-based jobs at SFO.

Gender (Tables F.1A and F.2A): Approximately 70 percent of airlines and service workers in the survey population are male, while males and females are represented approximately equally in the concession sector. Males and females are represented about equally in customer services, cabin cleaners and cashiers jobs, while men predominate in baggage handling and security/skycap/wheelchair work.

Race/ethnicity (Tables F.1B and F.2B): Race and ethnicity data are incomplete in the SFO Badge Office data, but we find high levels of minority employment in services and concessions. This pattern is replicated across all occupations, with a particularly notable concentration (67 percent) of screener/skycap/wheelchair positions held by Filipino immigrants.

Age distribution (Tables F.1C and F.2C): Age distribution does not vary much by sector. However, baggage and customer service workers tend to be younger than screener/ skycap/ wheelchair agents.

Table F.1 Demographic characteristics of workers by sector

Table F.1A Percentage of workers in job sectors by gender.

	Airlines	Services	Con- cessions	Total
Female	30	29	49	31
Male	70	71	51	69
Total	100	100	100	100

Source: SFO Badge Office Data, 2001.

Note: Data in each of the panels of this and the following table refers to ground-based, nonsupervisory employees only.

Table F.1B Percentage of workers in job sectors by race/ethnicity.

	Airlines	Services	Con- cessions	Total
White	37	9	9	25
Hispanic	12	20	16	15
Filipino	18	39	36	27
Black	10	5	3	8
Asian	22	26	36	25
Native American	1	0	0	0
Total	100	100	100	100

Table F.1C Percentage of workers in job sectors by age classes

	Airlines	Services	Con- cessions	Total
Up to 24	7	14	9	9
25-34	22	21	19	21
35-44	30	24	25	28
45-54	25	22	27	24
55-64	14	13	16	14
65 and up	2	6	4	3
Total	100	100	100	100

Table F.2 Demographic characteristics of workers by occupation**Table F.2A Percentage of workers by occupation and gender**

Gender	Customer service	Administrative	Baggage /ramp	Cabin cleaner	Screeners/ Skycap/ wheelchair	Bar/ cashier	Total
Female	51	31	8	45	38	60	31.7
Male	49	69	92	55	62	40	68.3
Total	100	100	100	100	100	100	100.0

Source: SFO Badge Office Data, 2001.

Table F.2B Percentage of workers by occupation and race/ethnicity

Race/ ethnicity	Customer service	Administrative	Baggage /ramp	Cabin cleaner	Screeners /skycap/ wheelchair	Bar/ cashier	Total
White	29	30	21	8	5	19	23.1
Hispanic	16	11	18	31	5	14	16.0
Filipino	20	21	30	31	67	31	28.7
Black	8	10	11	10	5	5	7.9
Asian	27	27	19	20	18	30	23.9
Native American	1	1	0	0	0	1	0.3
Total	100	100	100	100	100	100	100.0

Table F.2C Percentage of workers by occupation and age class

Age class	Customer service	Administrative	Baggage /ramp	Cabin cleaner	Screeners/ skycap/ wheelchair	Bar/ cashier	Total
To 24	11	5	12	5	10	9	9.3
25-34	24	16	24	15	14	22	21.1
35-44	29	36	29	25	20	27	27.5
45-54	23	29	22	33	22	26	24.5
55-64	12	13	11	19	21	13	14.2
65 and up	1	2	2	4	14	4	3.3
Total	100	100	100	100	100	100	100.0

F.3 Fixed costs and variable demand for air travel

To understand the particular pressures to reduce wages of ground-based airport workers, we need to examine the underlying economics of the airports and the airline industry. Airports provide fixed infrastructure services – runways for landing and take-off, aprons on which the aircraft park, and facilities to deal with passengers and cargo - that are intermediate inputs to the meeting of variable demand for travel.

Airline travel demand is characterized by peak load patterns that provide strong incentives to reduce fixed costs. The phenomenon of peaking refers to the fact that people prefer to fly at particular times of the day, week and year. This pattern implies that airlines face constant level of demand that is low relative to the capacity they must sustain during peak periods. A key business challenge for airlines is to maintain sufficient capacity to meet the demand at peak periods, without losing too much money during the low demand periods.

Fixed costs, which must be met regardless of activity levels, are a particular problem for firms facing such demand conditions. Variable costs, for example fuel costs, which constitute a large proportion of airline expenses, are not affected by peaking demand. Of course, ticket and cargo pricing strategies that are time-differentiated help to alleviate some of these problems, but such price differentiation is not always effective in highly competitive markets. Thus, a key element of any firm strategy in a peak-loading environment is to reduce fixed costs.

At the same time, airports themselves involve large infrastructure investments that are essentially fixed. The physical elements of an airport – the number of runways and their length, the size of the apron, the number of gates – together determine a fixed handling capacity that cannot be quickly or easily expanded to meet fluctuating levels of demand.

Under such conditions, it is advantageous to share the infrastructure costs among a range of users. For this reason, airports are operated as public or quasi-public facilities in most of the world.² From the perspective of an individual airline, public ownership of airports provides an institutional mechanism for providing sufficient capacity to meet peak demand, while allowing sufficient operational flexibility.

F.4 Changing airport leasing arrangements

A brief review of airport leasing and pricing policies helps explain why the ability of airlines to limit the fixed costs of airport operations is minimal. Before the 1960s, airline usage at U.S. airports was allocated simply on a queuing or first-come-first-served basis. As a result of increasing airline usage relative to airport capacity, airlines began to seek ways to secure runway and gate access at airports. This trend is particularly apparent in hub airports, where pressure on

² Airports are also usually publicly owned because they act as natural spatial monopolies, with high barriers to entry due to enormous initial construction costs and large network externalities. However, this reason for public ownership does not explain downward wage pressures at airports, and indeed one would expect rent-sharing (and hence higher wages) under monopolistic conditions.

facilities (runways and terminal gates) is especially intense. By the 1990s, two different systems were used to allocate scarce airport usage rights in the U.S.

One of these systems makes use of slot controls.³ Slots are specified time windows during which an airline may land at a given airport. This system is in place at four major airports in the United States (National, LaGuardia, JFK and O'Hare). Although the FAA first enacted this institutional reform in 1968, it has not been extended to other U.S. airports. At the slot-control airports, allocations are grandfathered and there have long been suggestions that major carriers hoard the prime slots to preclude competition (NRC 1999; Morrison and Winston 1990). Although the slots are tradable in theory, in order to "use it rather than lose it," airlines have to keep flying even when demand conditions might not warrant. In other words, the slot allocation system raises the airline's fixed costs of maintaining a presence at an airport hub.

A second approach involves long-term control of boarding gates. Airports often allocate scarce runway space on a first-come first-served basis. This pattern applies even in times of high congestion. As a consequence, the control of boarding gates determines *de facto* runway access. Airlines have thus sought contractual mechanisms through which to secure gate access.

Most gates at most major U.S. airports are leased through long term contracts that specify exclusive or preferential usage rights. A few airports have common use gates, but this approach has declined in importance. At SFO, as at many other airports, there is a mix of lease arrangements, with 82 percent of gates secured by long-term exclusive agreements (NRC 1999).

Long-term tenancy is desirable from the point of view of both airports (it provides guaranteed revenue streams against which airports can borrow) and airlines (it guarantees runway access during peak hours at hub airports). Long-term tenancy also gives airlines considerable say in airport management and investment decisions through so-called "majority-in-interest" clauses. But when combined with revenue-neutrality restrictions, long-term leases result in a situation in which airlines cannot easily adjust the fixed costs of airport operations.

Revenue-neutrality implies that public airport authorities cannot make profits in excess of certain allowable expenses. The motivation for this federally enforced rule is to limit the revenues that cities derive directly from airports. Each year, an airport authority's allowable expenses are met by adjustments to the landing fees and terminal (gate) lease fees that are paid by the airlines with long-term leases. In other words, if an airline wants to secure exclusive or preferential gate access at SFO, or an airport like it, the airline has to enter into a long-term agreement with the Airport. This long-term agreement effectively becomes a fixed cost that the airline has relatively little power to reduce.

Both slot-control and long-term gate leasing policies at the hub airports have contributed to turning airport operations into fixed costs for airlines. As we have already stated, individual airlines have relatively little power to reduce these costs at hub airports. The pressures to reduce fixed costs in other areas of the airline business have thus become particularly intense.⁴

³ Riker and Sened (1996) trace the development of the slot-control system.

⁴ These arguments depend on airport congestion. Without airport congestion the airlines are under less pressure to secure access to airport facilities and thus incur airport operations as a fixed expense.

To clarify the foregoing discussion, consider the actual situation at SFO. SFO receives revenue from three sources: aviation (51 percent of revenue in FY2000), concessions (43 percent) and sales and services (6 percent).⁵ Most aviation revenue comes from landing fees and terminal rentals paid by airlines. Additional aviation revenue is derived from non-terminal rentals such as cargo warehouses, hangars and other aviation support facilities. Concession revenue is received from parking, car rental firms, food and beverage outlets and other retail activities. All concession contracts have a minimum annual guarantee, with revenue sharing for income in excess of the minimum. Concession contracts generally run between one month and one year, although some contracts run for up to five years.

Airports achieve revenue neutrality by balancing allowable revenue with allowable expenses on a year-to-year basis. Allowable expenses include the costs of running the Airport, debt service, and a service payment to the City of San Francisco. The service payment to the City is capped at 16 percent of concession revenue, or \$5 million per year, whichever is greater. Each year residual balancing takes place, through adjustments to the landing fees and terminal rents paid by all airlines with long-term terminal leases, in accordance with a 1981 agreement. The agreement, set to expire in 2011, effectively prevents the city from generating revenue directly from airport activities. At the same time, it also shifts the risk associated with airport expansion to the airlines, which means that airport operations are a fixed expense for airlines.

⁵ Sales and services revenues are relatively unimportant and refer mainly to charges for utilities and police services.

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