

GAO

Report to the Chairman, Subcommittee
on Transportation and Related
Agencies, Committee on
Appropriations, House of
Representatives

July 2001

FREIGHT RAILROAD REGULATION

Surface Transportation
Board's Oversight Could
Benefit From Evidence
Better Identifying How
Mergers Affect Rates



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Abbreviations

BNSF	Burlington Northern and Santa Fe Railway
ICC	Interstate Commerce Commission
SP	Southern Pacific Transportation Company
UP	Union Pacific Railroad



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United States General Accounting Office
Washington, DC 20548

July 5, 2001

The Honorable Harold Rogers
Chairman, Subcommittee on
Transportation and Related Agencies
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

Railroads have been a primary mode of freight transportation for many years, especially for bulk commodities such as coal and grain. Over the last 25 years, the freight railroad industry has undergone substantial consolidation. Since 1994, just prior to the recent wave of mergers, the number of independent railroad systems with at least one Class I railroad¹ has decreased from 12 to 7.² In 1999, the five largest Class I railroads accounted for about 94 percent of the total Class I operating revenue and about 95 percent of total Class I revenue ton-miles.³ Railroads have consolidated largely to reduce costs and increase efficiency and competitiveness.

Industry consolidation has raised concerns from companies that ship and receive their goods by rail (rail shippers) and others about the lack of competition in the industry. In general, rail shippers are concerned that mergers have led to a reduction in railroad competition and consequently higher rail rates, poorer service, or both. In the context of railroad mergers, the Surface Transportation Board (the Board), which reviews railroad merger proposals, has defined “competitive harm” as the extent to which merging parties gain sufficient market power to profitably raise

¹Class I railroads are the nation’s largest freight railroads as measured by revenue. In 1999 (the latest data available), Class I railroads were those railroads whose operating revenues were \$258.5 million or more.

²The seven independent railroad systems include eight U.S. Class I railroads: Burlington Northern and Santa Fe Railway Co. (BNSF); CSX Transportation, Inc.; Grand Trunk Western Railroad, Inc.; Illinois Central Railroad Co.; Kansas City Southern Railway Co.; Norfolk Southern Railroad Co.; Soo Line Railroad Co.; and Union Pacific Railroad Co. It should be noted that Illinois Central and Grand Trunk Western are commonly controlled by the Canadian National Railway Co. and the Soo Line Railroad is controlled by the Canadian Pacific Railway Co.

³A revenue ton-mile is 1 ton of revenue freight transported 1 mile.

rates, reduce service, or both. (See app. I for a chronology of Class I railroad mergers since August 1995.)

This report responds to your request that we review the Board's oversight of railroad mergers.⁴ In particular, this report discusses (1) the role the Board plays in reviewing proposed railroad mergers and overseeing mergers that have been approved and how postmerger oversight is conducted, (2) how the Board mitigates potential harm to competition, and (3) how the Union Pacific/Southern Pacific merger affected rail rates in selected geographic areas. This report primarily focuses on mergers of Class I railroads since the Board was created in 1996. However, information on prior mergers is included to show how merger oversight has changed over time. Moreover, this report primarily focuses on issues pertaining to competition and not other issues that might arise from a merger.

To accomplish our objectives, we reviewed applicable laws, regulations, and decisions and met with Board officials, representatives of shippers' trade associations, and railroad officials. We also developed an econometric model to analyze selected merger-related rail rates using data from the Board's *Carload Waybill Sample*⁵ for the period 1994 through 1999. We focused our analysis on selected geographic areas associated with the 1996 merger of the Union Pacific Railroad (UP) with the Southern Pacific Transportation Company (SP) because of the significant competition issues pertaining to this merger. (See app. II for a more detailed discussion of how we carried out our work.)

Results in Brief

The Board is the federal agency responsible for reviewing railroad merger proposals and approving those that are consistent with the public interest. The Board also ensures that any potential merger-related harm to competition is mitigated. Mitigation efforts have focused on preserving competition. The Board also oversees mergers that have been approved. Oversight is not statutorily required, but when imposed, it has focused on determining whether conditions (such as granting the authority for one

⁴For the purposes of this report, the term "merger" includes merger, consolidation, and/or acquisition transactions between Class I railroads.

⁵The *Carload Waybill Sample* is a sample of railroad waybills (in general, documents prepared from bills of lading that authorize railroads to move shipments and collect freight charges); the sample contains information on rail rates.

railroad to operate over the tracks of another railroad) have been implemented and have been effective in protecting against potential harm to competition. As an adjudicatory agency, the Board relies on reports, comments, and other information (called the merger record) submitted by railroads, shippers, and others to conduct oversight. The merger record serves as the basis for oversight decisions. In recent years, as the complexity of mergers has increased and service disruptions associated with the merger integration process and other problems have occurred, the Board's oversight activities and reporting requirements have increased as well.

The Board has found little competition-related harm during oversight of recent mergers. The Board's action to address competition-related harm largely depends on the sufficiency of the evidence presented. In some cases, the Board has not acted to address competition-related concerns during oversight because it determined that the evidence of harm was not sufficient. In other cases, during oversight the Board has modified conditions that it originally imposed to mitigate potential harm to competition when it believed such action was necessary to preserve competition. Shipper association representatives and railroad officials with whom we spoke generally agreed that the Board's oversight process is a valuable mechanism that allows them to participate in the oversight of mergers. But some shipper association officials told us they were dissatisfied with the Board's oversight because they believe that the Board is not responsive to their concerns and the process is too time-consuming. Railroad officials told us that shippers try to use the process to address non-merger-related issues.

Using an econometric approach that isolated the specific effects of the Union Pacific/Southern Pacific merger on rail rates for certain commodities in two geographic areas—Reno, Nevada, and Salt Lake City, Utah—we found that the merger reduced rates for four of the six commodities we studied. However, for one of the commodities, the merger placed upward pressure on rates, even though other factors caused the overall rates to decrease. For the remaining commodity, rates were relatively unchanged by the merger. In analyzing rail rates as part of merger oversight, the Board examines the merger oversight record before it, which has generally focused on the overall direction and magnitude of rate changes. According to Board officials, in general, these records have not permitted the Board to reliably and precisely isolate the effects of mergers on rates from effects of other factors (such as the volume of shipments). Obtaining evidence that quantitatively separates the effects of mergers on rates from the effects of other factors, such as the volume of

shipments, would help the Board identify whether competition-related conditions imposed on mergers are meeting their objective. We are recommending that, as part of merger oversight, the Board, when appropriate, require the filing of information that identifies the effects of specific factors, including mergers, on postmerger rail rates.

Background

In 1995, the Congress passed the ICC Termination Act, which abolished the Interstate Commerce Commission (ICC) and created the Board. The act transferred many of ICC's core rail functions to the Board, including the responsibility to review and approve railroad mergers. The Board has exclusive jurisdiction to review proposed rail mergers, and if approved by the Board, such mergers are exempt from other laws (including federal antitrust laws that would otherwise apply to the transaction) as necessary to carry out the transaction. The Board also conducts oversight of mergers that have been approved. However, there is no statutory requirement for merger oversight. ICC had approximately 400 employees in 1995, its last year of operation. For fiscal year 2001, the Board received an appropriation to support 143 employees.

In October 2000, the Board proposed modifications to its regulations governing major rail consolidations. According to the notice of proposed rulemaking, the Board recognized that current merger regulations are outdated and inappropriate for addressing future major rail mergers that, if approved, would likely result in the creation of two North American transcontinental railroads. In June 2001, the Board adopted final regulations governing proposed major rail consolidations. The final regulations recognize the Board's concerns about what the appropriate rail merger policy should be in light of a declining number of Class I railroads, the elimination of excess capacity in the industry, and the serious service problems that have accompanied recent rail mergers. The final rules substantially increase the burden on applicants to demonstrate that a merger is in the public interest, in part by providing for enhanced competition and protecting service. The rules also establish a formal annual oversight period of not less than 5 years following a merger's approval.

The Board Determines Whether Mergers Are in the Public Interest and Assesses the Implementation of Merger Conditions

The Board is responsible for approving railroad mergers that it finds consistent with the public interest. When necessary and feasible, conditions are imposed by the Board to mitigate any potential harm to competition. Oversight is designed to ensure that merger conditions have been implemented and that they are meeting their intended purpose.

Merger Approval Involves Assessing the Public Interest and Mitigating Potential Harm to Competition

In determining, under the ICC Termination Act of 1995, whether proposed mergers are consistent with the public interest,⁶ the Board is required to consider a number of factors that relate to competition. These include the effect of a proposed transaction on the adequacy of transportation to the public; the effect on the public interest of including, or failing to include, other rail carriers in the area involved in the proposed transaction; and the impact of the proposed transaction on competition among rail carriers in the affected region or in the national rail system.⁷ The act also establishes a 15-month time limit for the Board to complete its review of accepted applications for mergers between Class I railroads and reach a final decision.⁸ Since the Board was created, two applications for merger between Class I railroads have been submitted—Conrail’s acquisition by CSX and Norfolk Southern and Canadian National/Illinois Central—both of which were approved. The Board also approved the Union Pacific’s acquisition of Southern Pacific, an application that had originally been submitted to ICC.

⁶The Board is charged with determining whether proposed transactions are in the public interest, not determining whether they comply with the antitrust laws. The Board is empowered to disapprove transactions that would not violate the antitrust laws and to approve transactions even if they otherwise would violate the antitrust laws.

⁷The Board is also required to consider the total debt (fixed charges) that would result from the proposed transaction and the interest of rail carrier employees affected by the proposed transaction. In addition, the Board must consider whether there will be significant effects on the quality of the human environment and the conservation of energy resources in its assessment of proposed merger transactions.

⁸If a merger application is approved, parties that would be affected by the merger may ask the Board to reconsider its decision. They may also appeal the decision directly to the federal courts.

During the merger review process, the Board considers comments and evidence submitted by all interested parties, which, together with the application, form the record upon which the Board bases its decision. The applicants as well as interested parties may submit information on the potential public benefits and potential harm of a proposed merger. Public benefits can include such things as gains in a railroad's efficiency, cost savings, and enhanced opportunities for single-line service.⁹ Potential harm can result from, among other things, reductions in competition and harm to a competing carrier's ability to provide essential services—that is, services for which there is a public need but for which adequate alternative transportation is not available.

Whenever necessary and feasible, the Board imposes conditions on mergers that it approves so as to mitigate potential harm associated with a merger, including harm to competition. In determining whether to approve a merger and to impose conditions on its approval, the Board's concern has focused on the preservation of competition and essential services—not on the survival of particular carriers or enhancing competition. Board officials told us that, while the Board's efforts to preserve competition have primarily focused on maintaining competitive options for those shippers that could face a reduction in service from two railroads to service by only one railroad, competition that is the result of having two “nearby” railroads has also been preserved.¹⁰

Conditions can include such things as trackage rights,¹¹ switching arrangements,¹² access to another railroad's facilities or terminal areas, or divestiture of lines. For example, in the UP/SP merger, the Board granted about 4,000 miles of trackage rights to the Burlington Northern and Santa Fe Railway (BNSF) to address competition-related issues for those rail

⁹Single-line service is the ability to transport products from an origin to a final destination without having to transfer the shipment to another railroad.

¹⁰Board officials said this has been accomplished by such things as conditioning approval of a merger on preservation of shippers' options to (1) build (or have some other party build) a track connection to a competing railroad (called the build-in/build-out condition) or (2) locate new facilities, including truck-to-rail or rail-to-truck “transload” facilities, on the lines of competing railroads.

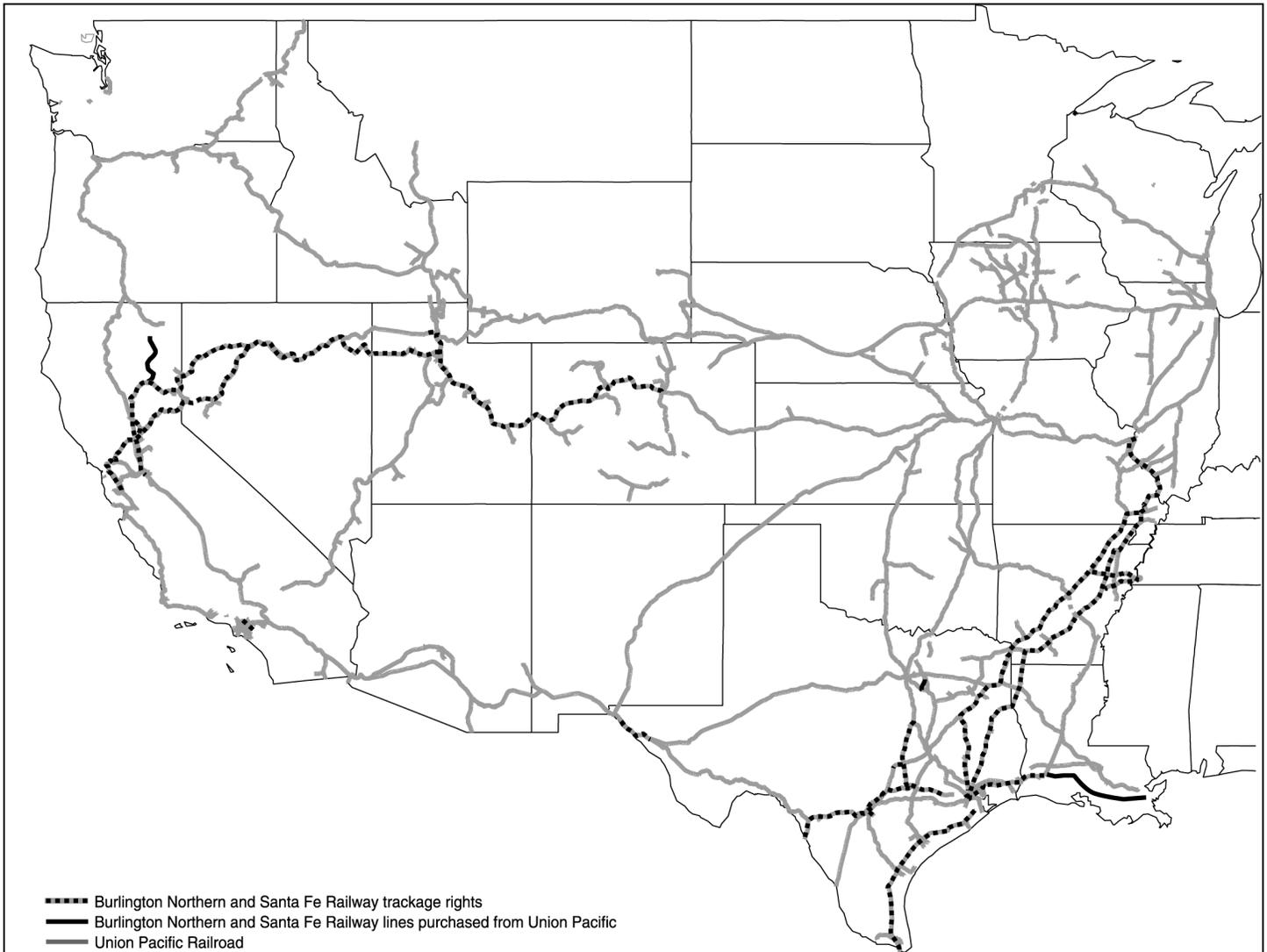
¹¹Trackage rights are the authority of one railroad to use the tracks of another railroad for a fee.

¹²Under switching arrangements, a carrier transports the railcars of a competing carrier at origin or destination for a fee.

corridors and shippers that could have potentially faced a reduction in service from two railroads (UP and SP) to service by only one railroad (UP). (See fig. 1.) The Board may also impose privately negotiated settlement agreements as conditions to mergers.¹³ The Board will normally impose conditions only when a merger would produce effects harmful to the public interest (such as a significant reduction in competition) and the condition will ameliorate or eliminate these harmful effects. In addition, a condition must be operationally feasible, produce net public benefits, and be tailored to address the adverse effects of a transaction.

¹³The Board will impose a privately negotiated agreement as a condition only if the Board would have imposed a condition to address the identified harm without the agreement or if the parties to the agreement request its imposition. Board officials have stated that privately negotiated terms and conditions are generally preferred over Board-crafted terms and conditions.

Figure 1: Trackage Rights Granted to, and Lines Purchased by, BNSF in the UP/SP Merger



Source: GAO's analysis of data from the Federal Railroad Administration and Burlington Northern and Santa Fe Railway.

The Board Conducts Oversight of Mergers

If a merger is approved, the Board has broad discretion to impose oversight conditions, as well as flexibility in how it conducts oversight. Such oversight conditions establish the Board's intent to monitor a merger's implementation and to conduct annual oversight proceedings (called formal oversight in this report). An oversight condition may also establish a time period during which the Board will monitor the effects of

a merger. Although oversight conditions are not necessary for the Board to retain jurisdiction over a merger—particularly with regard to carrying out conditions the Board has imposed—oversight conditions ensure that the Board’s retained jurisdiction will be meaningfully exercised and gives parties an added opportunity to demonstrate any specific anticompetitive effects of a merger. According to the Board, oversight also (1) permits the Board to target potential problem areas for the subsequent imposition of additional conditions if this proves warranted in light of experience, (2) puts applicants on notice that they consummate the transaction subject to reasonable future conditions to mitigate harm in limited areas, and (3) helps to ensure cooperation by the merging carriers in addressing problems and disputes that may arise following merger approval. As such, oversight provides an additional check that Board-approved mergers are in the public interest. When an oversight period ends, the Board has stated that it continues to retain jurisdiction and can reopen a merger proceeding, if necessary, to address concerns pertaining to competition and other problems that might develop.

Board officials described postmerger oversight as a process consisting mainly of an annual oversight proceeding. This proceeding is an examination of the implementation of merger conditions and whether conditions have effectively met their intended purpose. Oversight is generally conducted each year for 5 years after a merger has been approved.¹⁴ As part of the oversight proceeding, public comments and supporting information are formally submitted into the record by shippers, carriers, and other interested parties. Periodic progress reports, which provide, among other things, details on the implementation of conditions, are also submitted by merging railroads as required. Board officials told us that reporting requirements are frequently used as part of oversight and that such reporting has served to replace the industry and merger monitoring once conducted by ICC’s field staff.¹⁵

As an adjudicatory body, the Board relies on parties affected by a merger to identify whether a proposed transaction has harmed competition and, if

¹⁴According to Board officials, this time period is based on an expected length of 1 to 2 years for the merging carriers to prepare to integrate computer systems and negotiate labor contracts, and another 2 to 3 years to fully integrate the carriers operationally. In addition, Board staff told us that the full range of anticipated merger benefits should begin to be realized by about the third year following system integration.

¹⁵The Board has no field staff.

so, to what extent; the Board does not independently collect this type of information. Board officials noted that it has been standard practice in merger oversight to require relevant railroads, such as UP and BNSF in UP/SP oversight, to make available under seal to interested parties the railroads' confidential 100 percent traffic tapes—tapes that include information such as shipments moved and freight revenue generated—so that parties other than the merging carriers would also have the opportunity to submit postmerger rate analyses to the Board. As part of the oversight process, the Board may consider information obtained from monitoring industry operations, such as service levels, as well as any studies conducted, whether specific to that merger or industrywide. In conducting formal oversight, the Board may modify existing conditions if they are not achieving their intended purpose or may impose additional reporting requirements if necessary. The Board also has the authority to initiate a new proceeding to determine if additional conditions should be imposed to address unforeseen merger-related issues.

Board officials noted that the agency engages in other activities associated with oversight. Included are such things as informal monitoring of merging railroads' operations and service performance¹⁶ and responding to certain filings, such as petitions to clarify or modify a merger condition based on competition-related issues or other claims of merger harm.

Oversight Has Changed Over Time

Although the Board retains some form of oversight jurisdiction for all rail mergers, the use of formal merger oversight has become standard only since the mid-1990s. Board officials told us that before 1995, formal postapproval oversight of mergers was rare and was instituted only in unusual situations when strong concerns about competition were present. These officials pointed to only two cases when a period of formal oversight was imposed prior to 1995: once in 1984 in a rail/barge merger between CSX Corporation and American Commercial Lines, Inc., and in 1992 as part of the merger of Wisconsin Central Transportation Corporation and Fox Valley & Western, Ltd. Neither case involved the merger of two or more Class I railroads. In both cases, however, oversight conditions were imposed in response to concerns raised about potential harm to competition.

¹⁶Board officials told us that in informal monitoring, the Board's Office of Compliance and Enforcement requires merged railroads to report various metrics, such as average train speed, in order to monitor service levels and the operational performance of those carriers.

In recent years, in light of the complexity of transactions and the service and competitive issues that have arisen, the Board has expanded its use of formal oversight of railroad mergers. ICC did not impose specific oversight conditions on its approval of the 1995 Burlington Northern and Santa Fe Railway merger because, according to Board officials, there were few concerns raised in that merger about service issues or potential harm to competition.¹⁷ Since August 1995, when the BNSF merger was approved, the Board has imposed oversight on all three Class I railroad mergers that it has approved: the 1996 UP/SP merger, the 1998 Conrail acquisition by CSX and Norfolk Southern, and the 1999 Canadian National/Illinois Central merger. For two of the three transactions (UP/SP and Conrail), the oversight period was set for 5 years. In the third merger—Canadian National and Illinois Central—a 5-year oversight period was established with continuation to be reviewed annually. All three oversight periods are ongoing.

The Board has significant discretion and flexibility to adapt its oversight as circumstances warrant. For example, in conducting oversight in recent years, the Board has, when necessary, incorporated additional monitoring elements to supplement its oversight activities. For example, it has added more reporting requirements. The UP/SP merger provides a good illustration of service monitoring. As the result of a service crisis¹⁸ that developed during the implementation of this merger, the Board required both UP/SP and BNSF to provide weekly and monthly reports to its Office of Compliance and Enforcement—information which, according to Board officials, had never been available before. These reports included statistics on such things as average train speed, cars on line, and terminal dwell time—the time loaded railcars spend in a terminal awaiting continued

¹⁷The BNSF merger was largely an end-to-end merger, meaning there was little overlap in routes and few locations where shippers could go from service by two railroads to one.

¹⁸The UP/SP system started experiencing service problems in July 1997 during integration of the two railroads. As the result of aging rail infrastructure in the Houston area that was inadequate to cope with a surge in demand, congestion on this system began affecting rail service throughout the western United States. Rail service disruptions and lengthy shipment delays continued throughout the rest of 1997 and into 1998. The Board issued a series of decisions, many focused on the Houston/Gulf Coast area, including an emergency service order, to address the service crisis. The Board also initiated a separate postmerger proceeding to consider requests from various parties for additional merger conditions to modify the way in which rail service was being provided in the Houston area. In that proceeding, the Board added one condition and modified another to ease congestion in the Houston/Gulf Coast area. The Board also concluded that the service crisis did not stem from any competitive failure resulting from the UP/SP merger.

movement.¹⁹ This information allowed the Board to monitor the operations and service levels of both railroads. Similar reporting requirements were imposed on both CSX and Norfolk Southern in the Conrail merger. In this instance, the Board, anticipating possible transitional service problems during the integration process, required the weekly and monthly reports both to monitor the merger's implementation and to identify potential service problems.

Board officials told us that as a result of the lessons learned in the UP/SP merger, oversight has expanded to incorporate monitoring of operational and service issues—in part to serve as an early warning of problems that might occur during the merger integration process. Future mergers will also be subject to operational monitoring. The merger rules adopted by the Board in June 2001 state that the Board will continue to conduct significant postapproval operational monitoring of mergers to insure that service levels after a merger are reasonable and adequate.

The Board Has Acted to Address Harm to Competition, but Some Shippers and Carriers Are Concerned About Merger Oversight

In general, the Board has found few competition-related problems when conducting oversight of recent mergers but has acted to modify some conditions designed to address such problems when it felt such action was necessary. Even though many of the shipper and railroad trade associations told us that the oversight process is valuable, some shippers and small railroads are dissatisfied with aspects of the Board's oversight. In addition, some larger carriers are concerned that shippers are using the oversight process to address issues not related to mergers. The Board's recently adopted merger rules could affect oversight by changing the focus of merger approval toward enhancing rather than preserving competition.

¹⁹ A Board official said the latter does not include railcars waiting for repairs, maintenance-of-way equipment, or railcars arriving and departing on the same train.

The Board Has Found Few Postmerger Problems Regarding Competition in Recent Merger Oversight Proceedings and Has Acted to Address Them

A review of oversight decisions in recent merger cases shows that the Board has found few problems related to competition. Board officials also told us they believe that, to date, the conditions originally imposed on mergers have met their intended purpose and have mitigated any potential harm to competition. In determining whether to modify a condition,²⁰ the Board reviews the evidence presented, considers the nature and extent of the alleged harm, and assesses what action may be warranted. In general, the Board has not found it necessary to modify or add conditions during oversight of recent mergers. However, the Board has found such action to be appropriate in some cases. For example, in December 1998, the Board added a condition and modified a condition in the UP/SP merger. The added condition addressed traffic congestion in the Houston/Gulf Coast area; the modified condition changed the location where BNSF railcars are transferred to another railroad. Similarly, in 1998 and 1999, the Board modified four conditions in the Conrail transaction. These modifications were designed to preserve competition by, among other things, introducing a second carrier and requiring carriers to negotiate an acceptable transfer point to interchange railcars bound for an Indiana power plant.

Providing specific evidence of harm to competition is critical in obtaining additional Board relief. According to the Board's decisions, shippers and others have sometimes alleged harm to competition during oversight without presenting specific evidence of such harm. For example, as part of the UP/SP merger, the Board granted over 2,100 miles of trackage rights to BNSF on the Central Corridor²¹ to preserve competition for those shippers that could have been reduced from service by two carriers (UP and SP) to service by only one (the merged UP/SP) and for those exclusively served shippers who benefited from having another railroad nearby. Some organizations have asserted that, despite the trackage rights, postmerger competition has not been adequate on this corridor. However, in its UP/SP oversight decisions, the Board has concluded that postmerger competition on this corridor has been adequate, in part because no shippers came forward with specific evidence of harm. In another instance, in the Conrail

²⁰In addition to considering whether to modify or add conditions, Board officials said the merger oversight process has also been used to clarify conditions imposed in the original merger approval.

²¹The Central Corridor is generally defined as an area stretching from St. Louis, Missouri, to Oakland, California, by way of Denver, Colorado; Salt Lake City, Utah; and Reno, Nevada. BNSF's trackage rights were over the Denver-to-Oakland segment of the corridor.

merger, the Board granted trackage rights to Norfolk Southern to access a power plant in Indiana. In order to use the trackage rights, Norfolk Southern negotiated a fee with CSX. The power plant owner believed that the negotiated fee was too high to allow adequate competition between the railroads and requested a lower fee so that Norfolk Southern could compete for its business. In denying this request, the Board stated that the evidence of harm presented was not sufficient, in part because both CSX and Norfolk Southern demonstrated that the negotiated fee would amount to only a minimal cost increase (\$0.004 per ton) over the amount the Board had previously found to be reasonable.

A review of merger oversight documents shows the Board has acted to address competition-related postmerger issues when it believed such action was necessary. For example, during oversight of the Conrail acquisition, the Board reduced fees for trackage rights and switching charged to Canadian Pacific to permit competition between CSX and Canadian Pacific Railway in the Albany, New York, to New York City corridor. Although the Board had initially set these fees in a postmerger decision, the Board later determined that the fees were too high to allow Canadian Pacific to use CSX tracks to provide meaningful competition between the carriers. Consequently, the Board acted to reduce the fees to promote competition. The Board also acted during the Conrail oversight period to void provisions in two contracts between CSX Intermodal, Inc., a rail shipper, and Norfolk Southern that required Norfolk Southern to be the primary carrier of CSX Intermodal goods between northern New Jersey and Chicago during the contract period. Voiding these provisions allowed CSX immediately to compete with Norfolk Southern for these shipments.

All Parties Believe Oversight Is Valuable, but Some Shipper and Railroad Associations Are Dissatisfied

Shipper and railroad trade associations and railroad companies with whom we spoke believe postmerger oversight is a valuable process. Officials from the National Grain and Feed Association and the National Industrial Transportation League told us that the Board has always been willing to listen to their concerns. Officials from Norfolk Southern and BNSF said the merger oversight process provides shippers and railroads with an opportunity to submit merger-related questions, problems, and concerns. Railroad and railroad association officials stated that the Board acts to protect the interests of the public and the shipping community by allowing railroads and shippers to work together during oversight to resolve actual and potential merger-related problems. Officials from one trade association said that without an oversight process, their members might be faced with a less desirable alternative. For example, officials

from the American Chemistry Council told us that the only other option for shippers would be to use the Board's time-consuming and expensive complaint process. Officials from the American Chemistry Council, as well as officials from UP and BNSF, said a 5-year oversight period has been a benefit to both railroads and shippers. However, an American Chemistry Council official said some mergers may need oversight for a longer or shorter period than 5 years and that it is unclear what type of oversight will occur after the 5-year oversight period for the UP/SP merger expires in 2002.

Despite seeing oversight as a valuable process, some shipper and small railroad associations are dissatisfied with aspects of the Board's oversight procedures. A number of reasons were cited. The Board has been viewed as unresponsive to concerns of shippers and small railroads. For example, an official representing the Edison Electric Institute told us that it had expressed concern to the Board in 2000 about the degree of competition for the transport of Utah and Colorado coal in the Central Corridor, but that the Board declined to answer questions about this issue.²² An official from the American Chemistry Council expressed similar frustration that the Board did not adopt any part of a plan developed by shippers and others to address the Houston/Gulf Coast service crisis that occurred during the implementation of the UP/SP merger. This plan had broad support from both private sector and state government officials.²³ Dissatisfaction was also expressed about the time and resources required for preparing and submitting comments during the postmerger oversight period, especially for small shippers. For example, officials from the Edison Electric Institute and the American Chemistry Council told us that small shippers might not have the time or the money to invest in the formal oversight process. Finally, officials from several shipper associations and the American Short Line and Regional Railroad Association (an association representing smaller railroads) said their

²²Board officials told us that there was very little coal traffic affected by the merger (primarily in Utah) involving shippers that could have been reduced in service from two railroads to only one railroad. Board officials said that BNSF has competed for, and obtained, some of this traffic.

²³Board officials noted that the Board issued a series of decisions, many focused on Houston, including an emergency service order, to address the service crisis. Board officials said that the plan developed by the shippers and others would have taken property from UP and injected additional operators without improving service.

members are discouraged from participating in the oversight process, in part because of the reasons cited above.²⁴

Although generally satisfied with the Board's oversight process, officials at some Class I railroads have cited certain drawbacks to it. For example, officials at Norfolk Southern, CSX Transportation, and UP said some shippers use the formal oversight process as a mechanism to raise non-merger-related issues, which they claim have protracted the oversight process. Railroad officials told us that inviting comments by interested parties allows them to reintroduce issues that were initially denied during the merger approval process. They noted that, as a result, they must invest their time to address non-merger-related issues. Officials with Norfolk Southern said that if the Board allows parties to reintroduce issues already decided, this could delay implementation of a merger.

Board officials told us that oversight is an open process and anyone can submit comments. The basis for making decisions is the merger and postmerger oversight record and Board officials said they encourage parties such as shippers, railroads, and others to submit information into the record so that the Board can act with as much information as possible. However, Board officials acknowledged that parties sometimes reargue issues during oversight that were not decided in their favor in the merger decision. For example, in its November 2000 oversight decision in the Canadian National/Illinois Central merger, the Board refused to require that Canadian National sell its share of the Detroit River Tunnel as requested by various parties. The parties were concerned that Canadian National would competitively disadvantage the Detroit River Tunnel by not allowing needed capital investments to be made and favoring another nearby tunnel it owned. The Board found that this issue was not directly related to the merger and was a matter being privately negotiated between the parties. Finally, Board officials have said the oversight process has evolved over time and the Board has incorporated additional reporting and other requirements to provide more information on actual and potential problems experienced during merger implementation. Moreover, the Board has focused on preserving, not enhancing, competition and does not seek to restructure the competitive balance of the railroad industry during postmerger oversight.

²⁴Board officials noted, however, that numerous regional and shortline railroads, as well as smaller shipper interests and communities, participated in recent merger and merger oversight proceedings.

Both shipper association and railroad officials with whom we spoke recognized that the Board has a limited number of staff to conduct formal oversight. According to officials from the American Short Line and Regional Railroad Association, the Board's perceived slowness in handling oversight issues may be attributable to the significant amount of information that needs to be processed during the annual oversight proceeding—information that is generally handled by a core team of 15 employees (who, Board officials noted, also work on agency matters other than mergers). Board officials acknowledged that their resources are limited. However, they said oversight offers an open, no-fee process in which any interested party may participate. They also said the Board has issued in a timely manner its decisions in the annual oversight proceedings, as well as in matters involving specific material issues during oversight.

New Merger Rules Could Change Oversight but May Not Address All Concerns of Shippers and Carriers

The rail consolidation rules issued in June 2001 could change how the Board conducts oversight by providing for merger applications to include plans to enhance competition and to ensure reasonable service and by holding applicants accountable if they do not act reasonably to achieve promised merger benefits. Shifting the focus of merger review towards enhancing competition and ensuring reasonable service, as well as including some degree of accountability for postmerger benefits, could require the Board to expend additional time and resources reviewing these issues. For example, the final rules would call upon merger applicants to enhance competition so as to offset any negative effects resulting from a merger, such as potential harm to competition and disruptions of service. This could affect the way the Board uses and oversees conditions during the merger approval and oversight processes. Similarly, to require railroads to calculate the net public benefits to be gained through a proposed merger and to hold them accountable for acting reasonably to achieve these benefits, such as improved service, the Board will monitor as part of the general oversight proceeding the realization of merger benefits claimed. These activities would enlarge the current focus of assessing whether conditions are working as intended. In the event that public benefits fail to materialize after a merger is approved, the Board said it would consider the applicant's proposals for additional measures.²⁵

²⁵The Board did not specify what these additional measures might be in the final rules.

It is not likely that the final merger rules will resolve all concerns expressed by shipper and railroad organizations about oversight. The final rules will not change the basic process established for oversight. While the final rules may address concerns of shippers and railroads about service levels by requiring merger applicants to develop service assurance plans, they will not address more general concerns that the Board is not responsive to their issues.²⁶ Furthermore, the final rules will not likely address concerns about the time and resources necessary to participate in postmerger oversight. Rather, the amount of time and resources required could increase, given that during oversight the Board will assess enhancement of competition, service issues, and accountability for proposed merger benefits as well as whether conditions are working as intended. In addition, issues may continue to be introduced that are not directly related to the merger under review. Board officials said they do not consider participation in oversight to be an expensive or burdensome process. However, they acknowledged that the new merger rules would require applicants to provide more detailed information on competition, service, and benefits as part of the merger application and that the amount of time and resources required during oversight could increase.

Finally, the final rules may also not address all of the shippers' concerns about the extent of competition in the rail industry resulting from mergers. While provisions regarding the enhancement of competition may address some competition-related issues, it is not clear how these provisions will be implemented. Both shipper and railroad officials told us that enhanced competition had not been defined in the proposed rules and, therefore, they were not clear how the provisions might affect specific situations involving competition. The final rules acknowledge that the Board cannot predict in advance the type and quantity of competitive enhancements that would be appropriate in a particular merger proposal. Lastly, the new merger rules make clear that the Board will not use its authority to impose conditions during merger approval to provide a broad program of open access.²⁷

²⁶However, the final rules will require merging railroads to address regional and shortline railroad issues as part of oversight in order to monitor potential adverse effects of a merger on these railroads.

²⁷A system of open access would allow shippers, wherever possible, to be served by more than one railroad even if, to produce such a system, railroads that own the rail infrastructure used would be required to share their property with others that do not own this property.

The Board Could Benefit From Evidence Better Identifying How Mergers Affect Rail Rates

We analyzed the effects of the 1996 UP/SP merger on rail rates²⁸ in two selected geographic markets that have high concentrations of shippers that faced a reduction in service by two railroads to service by only one railroad (called 2-to-1 shippers). We found that the merger reduced rail rates for four of the six commodities we reviewed. However, in one instance, the merger placed upward pressure on rates, even though other factors caused overall rate decreases. For the remaining commodity, rates were relatively unchanged. Our analysis illustrates that the Board could make more informed decisions during oversight about whether merger conditions are protecting against harm to competition, as measured by the merger's effect on rates, if it had information that separated rate changes specifically resulting from a merger from rate changes caused by other factors.

UP/SP Merger Expected to Affect Competition in Selected Geographic Areas

A merger reduces the number of rail carriers and can potentially enhance the market power of remaining carriers. This enhanced market power could be used to profitably increase rail rates if no action were taken to preserve competition. Board officials told us that rate trends are a good indicator of postmerger competition. In 1996, UP acquired SP in a transaction that raised significant competition-related issues. This merger encompassed a number of geographic areas where the loss of competition from SP could have reduced the number of carriers from 2 to 1. Most of these areas were in Texas and Louisiana, but some were in the Central Corridor between California and Colorado. (See fig. 1.) In granting trackage rights to BNSF in this merger, the Board sought to replace the competition for potential 2-to-1 shippers in these geographic areas. To understand how the UP/SP merger affected rail rates, we looked at rail rates in two geographic areas—Reno, Nevada, and Salt Lake City, Utah—both in the Central Corridor. We selected these areas because they had high concentrations of potential 2-to-1 shippers and, according to BNSF and UP/SP officials, were less affected by the service crisis that developed during implementation of the UP/SP merger.²⁹ They also provided relatively clear examples of where BNSF service substituted for SP service.

The primary commodities shipped to and from Reno and Salt Lake City were nonmetallic minerals (such as barites) and chemicals (such as

²⁸Rail rates in this section are inflation-adjusted gross revenue per ton-mile of freight originated, in 1996 dollars.

²⁹A more complete discussion of our rate analysis is presented in app. III.

sulfuric acid or sodium). (See table 1.) Farm products (such as corn and wheat) accounted for about 13 percent of the traffic shipped to Salt Lake City. We also included coal in our analysis of Salt Lake City rail rates, since it accounted for the highest percentage of carloads shipped to and from that area. However, BNSF officials told us that, in general, they have not yet used the trackage rights they were granted to transport coal to or from the Salt Lake City area. In its decision approving the UP/SP merger, the Board noted that BNSF was granted access to only a small portion of coal traffic on the Central Corridor, mostly in the northwestern section of Utah. As the table shows, the potential 2-to-1 shippers served by BNSF, as a percentage of total shippers in these geographic areas, ranged from 10 to 22 percent. This is consistent with comments made by Board officials that BNSF received trackage rights to serve about 20 percent of the postmerger UP/SP traffic on the Central Corridor.

Table 1: Volume of Shipments, in Carloads, From the Reno and Salt Lake City Areas, 1994-99

Location of shipment ^a	Commodity ^b	Commodity's carload share of area traffic (in percent)	BNSF 2-to-1 shippers to all shippers (in percent)
From the Salt Lake City area	Chemicals	44 ^c	15
From the Salt Lake City area	Coal	69	^d
To the Salt Lake City area	Farm products	13 ^e	22
To the Salt Lake City area	Coal	52	^d
From the Reno area	Nonmetallic minerals	79	10
To the Reno area	Chemicals	32 ^f	15

^aThe areas are business economic areas. An economic area is a collection of counties used by the Bureau of Economic Analysis, within the U.S. Department of Commerce, for statistical reporting of regional economic activity.

^bThe commodities reported are generally those with the highest share of area carloads, from 1994 through 1999, excluding 1996 and intermodal traffic.

^cExcludes coal shipments.

^dNot applicable.

^eExcluding coal shipments, the commodity with the largest market share of traffic to the Salt Lake City area (in carloads) was waste and scraps (28 percent). However, the BNSF share of this traffic was only 1 percent. Consequently, we used the commodity with the next highest percentage of joint traffic—farm products.

^fThe commodity with the largest market share of traffic to the Reno area (in carloads) was coal (50 percent). However, BNSF did not ship coal to the Reno area in 1999, the most recent year of our study. Consequently, we used the commodity with the next highest percentage of joint traffic—chemicals.

Source: GAO's analysis of Surface Transportation Board data.

UP/SP Merger Generally Decreased Rail Rates, but Not for All Commodities and Not for All Shippers

Our analysis found that by itself the merger would have served to reduce rates for four of the six commodities shipped to or from the geographic areas we chose. (See table 2.) Specifically, the merger would have reduced rates for coal shipments to and from the Salt Lake City area (by 8 percent and 10 percent, respectively), chemical shipments from the Salt Lake City area (by 6 percent), and farm products to the Salt Lake City area (by 5 percent). However, the rates for shipments of chemicals to the Reno area

would have increased by 21 percent because of the merger,³⁰ while rates for shipments of nonmetallic minerals originating in the Reno area would have been relatively unchanged by the merger (i.e., the merger-related change was not statistically significant).³¹ The effect of a merger on rail rates depends on the cost savings the merger might generate relative to the exercise of any enhanced market power by the railroad carriers. Since the Board acted to preserve the level of competition by granting trackage rights to BNSF to serve potential 2-to-1 shippers in these geographic areas, the rate decreases from the merger likely reflect cost savings from the consolidation. Another way in which the merger could result in lower rates is if BNSF provided more effective competition to UP in the postmerger period than SP did in the premerger period.

³⁰This result may be attributable to changes in competition between the premerger and postmerger periods. Compared with the Salt Lake City area, the Reno area has a very small volume of chemicals shipments—based on carloads, the Salt Lake City area has more than three times the volume of the Reno area. Given the high fixed costs in the rail industry, large volumes of shipments are generally necessary to attract competition. This result may also reflect cost differences between SP and BNSF. According to BNSF officials, SP, because it had access to both 2-to-1 and non-2-to-1 shippers in the Reno area, had substantially more customers in the premerger period than BNSF (which has access only to 2-to-1 shippers) has in the postmerger period. As a result, SP could have spread its costs among more customers and therefore offered more competitive rates to UP than rates currently offered by BNSF. Without commenting on Reno or Salt Lake City, Board officials also noted that, overall, SP's premerger rates were not covering all its costs and were thus not sustainable. Board officials further noted that BNSF has been able to successfully compete for the business of a facility near Reno after the Board clarified that this facility qualified for BNSF service under the Board's new facility condition. Finally, Board officials said that business from new facilities such as this would add to BNSF's volumes and enable it to compete more effectively for other traffic.

³¹For the nonmetallic minerals, the changes were not statistically significant, meaning there was no meaningful difference between premerger and postmerger rates.

Table 2: Changes in Postmerger Rail Rates Due to Merger and Other Factors, 1994-99

Changes in percent					
Shipments	Commodity	Shipper/ postmerger railroad	Rate changes due to merger	Rate changes due to other factors	Overall changes in rates
From the Salt Lake City area	Chemicals	All shippers/ BNSF & UP	-6	16	10
From the Salt Lake City area	Coal	All shippers/ UP	-10	20	10
To the Salt Lake City area	Farm products	All shippers/ BNSF & UP	-5	6	1
To the Salt Lake City area	Coal	All shippers/ UP	-8	23	15
From the Reno area	Nonmetallic minerals	All shippers/ BNSF & UP	4	-26	-22
To the Reno area	Chemicals	All shippers/ BNSF & UP	21	-27	-6

Notes: The overall rate changes and the rate changes reflecting effects of the merger are determined by two different methods. Overall rate changes, which are unweighted, are based on a mean-difference analysis that subtracts the premerger rates from the postmerger rates. Results for the rate changes due to the merger are based on an econometric analysis. For the overall changes in rates and the merger effects, all values in bold/italics are statistically significant at the 5-percent level. The effects due to changes in other factors are calculated as the overall changes in rates less the merger effects.

See also notes to table 1.

Source: GAO's analysis of Surface Transportation Board data.

While the effects of a merger can put downward (or upward) pressure on rates, an analysis focused on overall rate changes alone could lead to an inaccurate conclusion about whether conditions imposed on a merger to mitigate potential harm to competition have been effective. The results of our analysis indicate that, in addition to merger effects, other factors, such as the volume of shipments, had an equal or greater influence on overall rate changes for the specific movements we examined. In some cases, the effects of these other factors were strong enough to offset or even reverse the downward pressure of the merger on rates. (See table 2.) For example, for shipments of chemicals from the Salt Lake City area and for shipments of coal to and from the Salt Lake City area, while the merger alone would have decreased rates, the rates nevertheless increased overall. On the

other hand, while rates decreased overall for chemicals shipments to the Reno area, the merger by itself put an upward pressure on rates.³²

Finally, we found that postmerger rates for potential 2-to-1 shippers (served by BNSF) in the Reno and Salt Lake City areas decreased for one of the commodities we looked at but were essentially unchanged in three other instances.³³ (See table 3.) The rate changes for potential 2-to-1 shippers (served by BNSF) shipping chemicals from the Salt Lake City area were about 16 percentage points less than similar rates for shippers shipping similar products but served solely by UP.³⁴ However, rail rate changes for potential 2-to-1 shippers (served by BNSF) who shipped farm products to the Salt Lake City area, nonmetallic minerals from the Reno area, and chemicals to the Reno area were all higher than for shippers served exclusively by UP, but this difference was not statistically significant, meaning that the rates were essentially unchanged. These results are not wholly unexpected, since the levels of rail competition for the two kinds of shippers—potential 2-to-1 and non-2-to-1—differ and rail rates are set using differential pricing.³⁵ Under differential pricing, shippers

³²As table 2 shows, the overall changes in rates are different between the Salt Lake City and Reno areas. This may be attributable to several reasons. First, the volume of shipments from the Reno area is much smaller compared with the Salt Lake City area. This difference in volume can magnify the impact of slight changes in tonnage on our measured rail rates (revenue per ton-mile). Second, costs between the two areas were different. For the commodities that we examined, postmerger costs were slightly lower in the Reno area compared with the Salt Lake City area (see app. III). Finally, there was a change in demand for some products shipped from the Reno area. According to UP officials, the decline in the prices of oil, gold, and copper in the latter part of the 1990s reduced the demand for the mining-related products shipped from the Reno area. Each of these nonmerger factors may have contributed to decreased overall rates in the Reno area.

³³Although the UP traffic used in our analysis consists of both 2-to-1 shippers and non-2-to-1 shippers, according to UP officials, most of the postmerger traffic in Reno and Salt Lake City retained by UP after the merger was solely served by UP prior to the merger.

³⁴Similar statistical analyses could not be performed for the overall rate changes because the data were unbalanced—that is, the sample sizes were not the same. See app. III for more information.

³⁵These results were similar to those found in other recent studies of rail rates (see Curtis Grimm and Clifford Winston, “Competition in the Deregulated Railroad Industry: Sources, Effects, and Policy Issues” in *Deregulation of Network Industries: What’s Next?*, Peltzman and Winston (ed.), AEI-Brookings Joint Center for Regulatory Studies: Washington, DC: 2000. This study, which is based on a survey of shippers who are members of the National Industrial Transportation League, Edison Electric Institute, and the Alliance for Rail Competition, and which uses a more restrictive definition of shippers served solely by one railroad than the definition we applied here, estimated that shippers served solely by one railroad paid freight charges that were about 21 percent higher than those paid by other shippers.

with less effective transportation alternatives generally pay a proportionately greater share of a railroad's fixed costs than shippers with more effective transportation alternatives.³⁶

Table 3: Changes in Postmerger Rail Rates for Potential 2-to-1 Shippers Compared With Rail Rates for Shippers Served Solely by UP

Shipments	Commodity ^a	Shipper category	Rate changes due to merger ^b (in percentage points)
From the Salt Lake City area	Chemicals	2-to-1 shippers compared with shippers served solely by UP	-16
To the Salt Lake City area	Farm products	2-to-1 shippers compared with shippers served solely by UP	0.3
From the Reno area	Nonmetallic minerals	2-to-1 shippers compared with shippers served solely by UP	6
To the Reno area	Chemicals	2-to-1 shippers compared with shippers served solely by UP	4

^aCoal is excluded from this table because there were no potential 2-to-1 shippers for this commodity in either the Salt Lake City or the Reno areas.

^bThis column shows the rate changes for potential 2-to-1 shippers (served by BNSF) less the rate changes for shippers served solely by UP/SP. A negative value indicates that rates for potential 2-to-1 shippers decreased more than the rates for shippers served solely by UP. The numbers are shown as percentage point differences. This is the difference between two percentage values. All values in bold /italics are statistically significant at the 5-percent level.

See also notes to table 1.

Source: GAO's analysis of Surface Transportation Board data.

There are limitations in the analysis and data we used. The results presented are only for the two geographic markets we reviewed and cannot be generalized to other geographic locations or for rate changes from the UP/SP merger as a whole. In addition, although econometric models of the factors that determine rail rates have been used to analyze a variety of policy-related issues in rail transportation³⁷ and have been useful, such a model can be sensitive to how it is specified. We tested the

³⁶For more information on differential pricing, see *Railroad Regulation: Changes in Railroad Rates and Service Quality Since 1990* (GAO/RCED-99-93, Apr. 16, 1999).

³⁷See, for example, studies of the 1980 Staggers Rail Act on rail rates by Wesley Wilson, "Market-Specific Effects of Rail Deregulation," *Journal of Industrial Economics*, Vol. XLII (1994), pp. 1-22.

model's key results to ensure that our findings were reliable and are confident that the results are reasonable for the commodities in the geographic areas we examined. Finally, the *Carload Waybill Sample* data used in our model also have limitations. For example, these data do not necessarily reflect discounts or other rate adjustments that might be made retroactively by carriers to shippers exceeding certain volume requirements.³⁸

The Board's Oversight Could Benefit From Evidence Better Identifying Merger-Related Rail Rate Changes

Our analysis provides an example of how rates subject to merger conditions could be analyzed. Although the results in this study are not directly comparable to those in other studies of rates that are based on broader geographic areas, our analysis suggests that overall rate changes do not identify the specific impact of mergers on rates. In general, the Board has been presented with rate studies that have focused on overall rate changes, not on the portion of changes caused by a merger. For example, rate studies³⁹ prepared by UP during merger oversight indicate that, overall, rates decreased immediately after the merger and have continued to decrease at 2-to-1 points and for traffic moving in the Houston-Memphis and Houston-New Orleans corridors. Similarly, both CSX and Norfolk Southern have conducted studies of rail rates in the Buffalo, New York, area since their acquisition of Conrail in 1999. Again, these studies have focused on the overall direction of rate changes and have shown that rail rates in the Buffalo area have generally decreased. Neither the UP nor the CSX/Norfolk Southern rate studies identified the specific effects of mergers on rates—effects that could have potentially been different from the overall rate trends.

According to Board officials, in general, the parties in merger oversight proceedings have focused on determining the overall magnitude and direction of rate changes without trying to relate such changes to specific causes, and the Board's own December 2000 staff study of nationwide

³⁸For additional information on the data and model used in this analysis as well as limitations, see apps. I and III.

³⁹UP has conducted three studies of rail rates associated with its merger with SP. They compare the periods October 1995-March 1996 to October 1996-March 1997, October 1996-March 1997 to October 1997-March 1998, and October 1997-March 1998 to October 1998-March 1999. These studies have been used during oversight of the UP/SP merger.

changes in rail rates took this approach.⁴⁰ Board officials said they have attempted to take into account, in the context of postmerger oversight, such non-merger-related factors as the recent significant rise in diesel fuel prices but have not been presented with an econometric approach to analyze rail rates in the context of merger oversight. They said that they had questions and concerns about the precision and reliability of the analysis we conducted. However, the Board is amenable to seeing this general approach developed in the context of a public merger oversight record where it would be subject to scrutiny and refinement by relevant parties. Board officials noted that presenting and rebutting econometric studies, because of their sophisticated nature, could increase the burden of participating in the merger oversight process. It is important to note that the Board, in approving the UP/SP merger, was provided with various empirical rate studies by the applicants and interested parties that included econometric analyses.⁴¹ In addition, econometric evidence has played an important role in merger-related cases that have been reviewed by courts and other government agencies.⁴²

Conclusions

As an adjudicatory agency, the Board relies on affected parties to identify alleged harm when it exercises oversight to ensure that conditions

⁴⁰See Surface Transportation Board, *Rail Rates Continue Multi-Year Decline*, Office of Economics, Environmental Analysis, and Administration (Dec. 2000). See also [GAO/RCED-99-93](#), which reviewed an earlier similar Board rate study. According to Board officials, the Board's 2000 staff study showed that rail rates in the West were stable from 1992 to 1994, but resumed their long-term decline once the restructuring of the western rail network had begun, and fell 9 percent, or about 3.1 percent per year, during the 3-year period following the UP/SP merger. Rail rates on coal movements in the West declined even faster during this 3-year period—14.2 percent, or about 5 percent per year. The Board stated that rate decreases of this magnitude could not have been realized if the UP/SP and BNSF mergers had substantially decreased rail competition in the region.

⁴¹See Surface Transportation Board, Finance Docket No. 32760, Decision 44 (Aug. 6, 1996), pp. 119-121 and 267-273. According to Board officials, these studies were considered but were found to contain certain flaws that limited their applicability in that proceeding. Board officials also noted that no party has attempted to submit such an analysis in an oversight proceeding to date.

⁴²For instance, in *FTC v. Staples, Inc.*, 970 F Supp. 1066 (D.D.C. 1997) the court relied heavily on the results of econometric analysis. According to a Federal Trade Commission official, one of the first examples of the use of econometrics in a regulatory proceeding was in connection with the hearings on concentration in American industry conducted by the Temporary National Economic Committee on the iron and steel industry in 1940. (See prepared remarks of Jonathan B. Baker, Director, Bureau of Economics, Federal Trade Commission, Before the George Mason University Law Review Symposium, Oct. 11, 1996.)

imposed in railroad mergers are working and that competition has not been harmed. Therefore, it is necessary for shippers, railroads, or others not only to identify instances when they have been, or might be, harmed, but also to present evidence to the Board demonstrating this harm. For the Board to make sound decisions about the extent to which mergers affect rate changes, the Board should have information that separately identifies the factors that affect rates and the specific impact of these factors. Without such information, the Board's ability to evaluate whether merger conditions have been effective in protecting against potential harm to competition may be limited.

Recommendation for Executive Action

To better assist the Board in the oversight of railroad mergers and in ensuring that conditions imposed in such mergers protect against potential harm to competition, we recommend that the Board, when appropriate, require railroads and others to provide information to the Board that separately identifies the factors affecting postmerger changes in rail rates and the specific impact of these factors on rate changes. In particular, the Board, when appropriate, should require railroads and others to provide information that identifies the effects of mergers on changes to rail rates, particularly in those geographic areas subject to potential reductions in competition. This information should be considered in deliberations on the need to modify conditions, add reporting requirements, or initiate proceedings to determine if additional conditions are required to address competition-related issues.

Agency Comments and Our Evaluation

We provided a draft of this report to the Surface Transportation Board and the Department of Transportation for their review and comment. The Board did not express an overall opinion on the draft report, but rather supplied suggested revisions to it. Most importantly, while the Board is amenable to seeing an econometric approach developed in the context of a public oversight record, it commented that such an approach could increase the burden of the parties participating in the merger oversight process. This increased burden might occur because of the effort entailed to develop, present, and rebut econometric studies. We agree that an increased burden might occur and incorporated this view into our report. Allowing parties to critique the usefulness of our recommendation and the effort involved in implementing it should provide the Board with the information it needs on implementation. The Board offered extensive clarifying, presentational, and technical comments which, with few exceptions, we incorporated into our report.

The Department of Transportation did not express an overall opinion on the draft report. Its comments were limited to noting that several Class I railroads were under common control. We incorporated this change into our report.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 15 days after the date of this letter. At that time, we will send copies of the report to congressional committees with responsibilities for transportation issues; the Secretary of Transportation; the Acting Administrator of the Federal Railroad Administration; the Chairman of the Surface Transportation Board; and the Director, Office of Management and Budget. We will also make copies available to others upon request. This report will also be available on our home page at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-2834. Key contributors to this report were Stephen Brown, Helen Desaulniers, Leonard Ellis, John Karikari, Tina Kinney, Richard Jorgenson, Mehrzad Nadji, Melissa Pickworth, James Ratzemberger, and Phyllis Scheinberg.

Sincerely yours,



John H. Anderson, Jr.
Managing Director, Physical
Infrastructure Issues

Appendix I: Chronology of Class I Railroad Mergers—August 1995 Through June 2001

1995

Burlington Northern Inc. and Burlington Northern Railroad Company – Control and Merger – Santa Fe Pacific Corporation and the Atchison, Topeka and Santa Fe Railway Company

Merger approval date:	August 16, 1995
Total route mileage:	35,400
Service area:	Western United States and Canada
Acquisition cost:	\$1.3 billion, plus assumed liabilities
Type of merger:	Largely end-to-end. However, in approving this merger, ICC found that of the approximately 29 locations that were served by both railroads, only a few would have potentially sustained harm from reduced competition given the presence of other railroads and of extensive truck competition at many of the locations. Conditions were attached to preserve competition where necessary.

1996

Union Pacific Corporation, Union Pacific Railroad Company, and Missouri Pacific Railroad Company – Control and Merger – Southern Pacific Rail Corporation, Southern Pacific Transportation Company, St. Louis Southwestern Railway Company, SPCSL Corp., and The Denver and Rio Grande Western Railroad Company

Merger approval date:	August 6, 1996
Total route mileage:	38,654
Service area:	Western United States
Acquisition cost:	\$3.3 billion in cash and stock, plus assumed liabilities
Type of merger:	Significant parallel components. In approving this merger, the Board granted about 4,000 miles of trackage rights to BNSF and other railroads to protect potential 2-to-1 shippers and others from loss of competition.

1997

No Class I merger transactions.

1998

CSX Corporation and CSX Transportation, Inc., Norfolk Southern Corporation and Norfolk Southern Railway Company – Control and Operating Leases/Agreements – Conrail, Inc. and Consolidated Rail Corporation

Merger approval date:	July 20, 1998
Route mileage (CSX and CSX portion of Conrail):	About 23,000
Route mileage (Norfolk Southern and Norfolk Southern portion of Conrail):	About 21,800
Service area:	Eastern United States and Canada
Acquisition cost:	\$9.9 billion, plus assumed liabilities and fees
Type of merger:	Largely end-to-end.

Additional information:

Although CSX Corporation and Norfolk Southern Corporation jointly acquired Conrail and then divided most of the assets between them, Conrail continues to operate certain shared assets areas for the joint benefit of CSX and Norfolk Southern. These shared assets areas are located in North Jersey (generally from northern New Jersey to Trenton, New Jersey), South Jersey/Philadelphia (generally from Trenton, New Jersey, to Philadelphia and southern New Jersey), and Detroit. Both CSX and Norfolk Southern have the right to operate their own trains, with their own crews and equipment and at their own expense, over any track included in the shared assets areas. Various other areas formerly operated by Conrail are subject to special arrangements that provide for a sharing of routes or facilities to a certain extent. For example, the Monongahela Area in Pennsylvania and West Virginia, although conveyed to Norfolk Southern, is available to CSX on an equal-access basis for 25 years, subject to renewal.

1999

Canadian National Railway Company, Grand Trunk Corporation, and Grand Trunk Western Railroad Incorporated – Control – Illinois Central Corporation, Illinois Central Railroad Company, Chicago, Central and Pacific Railroad Company and Cedar River Railroad Company

Merger approval date:	May 21, 1999
Total route mileage:	18,670
Service area:	Midwestern United States and Canada
Acquisition cost:	\$1.8 billion, plus the value of 10.1 million common shares of Canadian National stock
Type of merger:	End-to-end.

2000

No Class I merger transactions.

2001

No Class I merger transactions proposed through June 2001.

Appendix II: Scope and Methodology

Our review focused primarily on the Board’s oversight of Class I railroad mergers that occurred since its creation in January 1996. These mergers included (1) the Union Pacific Railroad Company (UP) with the Southern Pacific Transportation Company (SP), (2) the Canadian National Railway Company with the Illinois Central Railroad and (3) the acquisition of the Consolidated Rail Corporation (Conrail) by CSX Transportation, Inc., and the Norfolk Southern Corporation. However, to aid in showing how merger oversight has changed over time, we also included information on the Burlington Northern Railroad Company merger with the Atchison Topeka and Santa Fe Railway Company, which was approved by ICC in August 1995.

To address the role of the Board in approving and overseeing railroad mergers and to determine how merger oversight is conducted, we reviewed relevant laws and regulations and analyzed documents prepared by the Board addressing its merger authority and functions. We also discussed with the Board’s staff how merger oversight is conducted and how such oversight has changed over time. In addition, we discussed with the Board’s staff the activities conducted as part of formal oversight—that is, activities included in an annual general oversight proceeding—as well as informal oversight activities (such as monitoring of railroad performance data) associated with mergers.

To address how the Board acts to mitigate potential merger-related harm to competition, we reviewed documents contained in its merger dockets, including merger approval and oversight decisions and progress reports filed by merged railroads. We discussed with Board officials how oversight of conditions is conducted and the factors considered by the Board in determining if conditions imposed have been effective in mitigating potential harm to competition. We also discussed oversight issues with various trade associations representing shipper and railroad interests as well as with officials from Class I railroads. (The organizations we contacted are listed at the end of this app.) The shipper trade associations represented major commodities shipped by rail. Finally, to identify how merger oversight might change in the future, we reviewed the Board’s notice of proposed rulemaking on major rail consolidations published in October 2000 and the final regulations issued in June 2001. We discussed with the Board how the final merger rules differed from the proposed rules.

To address how the UP/SP merger affected rail rates in selected geographic areas, we obtained data from the Board’s *Carload Waybill Sample* for the years 1994 through 1999. The *Carload Waybill Sample* is a

sample of railroad waybills (in general, documents prepared from bills of lading authorizing railroads to move shipments and collect freight charges) submitted by railroads annually. We used these data to obtain information on rail rates charged by different railroads for specific commodities in specific markets subject to potential reduction in competition in the UP/SP merger. We focused on this merger because it was identified by the Board as having significant competition-related issues, especially in the number of shippers potentially going from service by two railroads to service by only one railroad (called 2-to-1 shippers).

Using documents submitted by the Union Pacific Railroad, as well as discussions with officials from both the Union Pacific Railroad and the Burlington Northern and Santa Fe Railway, we identified those locations and corridors containing the majority of potential 2-to-1 shippers. Using economic areas defined by the Department of Commerce's Bureau of Economic Analysis, our analysis focused on those economic areas containing the majority of these potential 2-to-1 shippers. We used the *Carload Waybill Sample* instead of more specific data on rates for individual shippers because of the lack of sufficient premerger rate data from SP's operations. Although it is possible to get rates for 2-to-1 shippers from the *Carload Waybill Sample*, the sample is not designed for use in analyzing rates for specific shippers. However, the sample can be used to analyze rail rates within and between geographic areas. For these reasons, we used economic areas containing a majority of potential 2-to-1 points in conjunction with the *Carload Waybill Sample* to conduct our analysis. The rate data obtained from the *Carload Waybill Sample* were then used in an econometric model that analyzed the effects of the UP/SP merger on changes to rail rates for various commodity shipments to and from the economic areas with the majority of potential 2-to-1 shippers. A detailed description and discussion of this model can be found in appendix III.

Some railroad movements contained in the *Carload Waybill Sample* are governed by contracts between shippers and railroads. To avoid disclosure of confidential business information, the Board provides for railroads to mask the revenues associated with these movements prior to making this information available to the public. We obtained a version of the *Carload Waybill Sample* that did not mask revenues associated with railroad movements made under contract. Therefore, the rate analysis presented in this report presents a truer picture of rail rates than analyses that are based solely on publicly available information. There are also limitations associated with data from the *Carload Waybill Sample*. For example, according to Board officials, revenues derived from this sample are not adjusted for such things as year-end discounts and refunds that

may be provided by railroads to shippers that exceed certain volume requirements. However, both Board and railroad officials agreed that, given the lack of sufficient premerger SP data, the *Carload Waybill Sample* was the best data source available for conducting our analysis.

We performed our work from July 2000 through June 2001 in accordance with generally accepted government auditing standards.

Organizations Contacted

Federal Agencies

Department of Transportation
Federal Railroad Administration
Surface Transportation Board

Shipper Associations

American Chemistry Council
Edison Electric Institute
National Grain and Feed Association
National Industrial Transportation League
National Mining Association
Society of the Plastics Industry

Railroad Associations

American Short Line and Regional Railroad Association
Association of American Railroads

Railroads

Burlington Northern and Santa Fe Railway Co.
CSX Transportation, Inc.
Norfolk Southern Corporation
Union Pacific Railroad Co.

Law Firms Representing Railroads or Shipper Associations

Covington and Burling
Gollatz, Griffin & Ewing, P.C.
LeBoeuf, Lamb, Greene, MacRae, LLP
Thompson, Hine, and Flory

Appendix III: Description and Discussion of Econometric Model Used to Conduct Rail Rate Analysis

This appendix describes and discusses our analysis of the effects of the 1996 UP/SP merger on rail rates in selected geographic areas where the merger had the potential for harm to competition because 2-to-1 shippers could have lost one of the two railroad carriers upon which they had relied. In particular, we discuss (1) the econometric model we developed to analyze separately the effects of the merger and of other factors on rail rates, (2) the construction of the data used for the analysis, and (3) our analysis, including a comparison of overall changes in rates, based on mean-difference analysis, with the results of the econometric model.

An Econometric Model of the Impact of the UP/SP Merger on Rail Rates

We developed an econometric model to examine both the specific impact of the 1996 UP/SP merger and the impact of other factors on rates in selected geographic areas where competition could have been potentially reduced. In developing the model, we focused on the trackage rights granted to BNSF by the Board, and applied existing empirical literature on how rail rates are determined.

The Board Granted Trackage Rights to Preserve Competition in the UP/SP Merger

The UP/SP merger covered areas where the services provided by UP overlapped those provided by SP. As a result, some rail shippers could have been reduced from being directly served by both SP and UP to being directly served by UP only. In order to preserve competition in those potential 2-to-1 situations and for those shippers exclusively served by UP or SP who benefited from having another independent railroad nearby, the Board granted trackage rights to BNSF in order to replace the competition that would be lost when SP was absorbed by UP.¹

Factors Affecting Rail Rates in the UP/SP Merger

As done in previous studies, we use an econometric model to identify the factors affecting rail rates following the UP/SP merger—rail rates being the dependent variable used in the model.²

¹For the most part, the BNSF trackage rights condition imposed by the Board does not provide for direct access by BNSF to 3-to-2 shippers (shippers who could obtain service from UP, SP, and one other rail carrier before the merger, but would have only two carriers available to them after the UP/SP merger).

²Some of the previous models examined the effects of the Staggers Rail Act of 1980 on rates. See, for example, Mark Burton, "Railroad Deregulation, Carrier Behavior, and Shipper Response: A Disaggregated Analysis," *Journal of Regulatory Economics*, Vol. 5 (1993), pp. 417-434; and Wilson (1994).

Rail Rates: We measured rail rates—the freight rate charged by a railroad to haul a commodity from an origin to a destination—by revenue per ton-mile, adjusted for inflation.³ We used data from 1994 and 1995 for the premerger period, and data from 1997 through 1999 for the postmerger period. We excluded 1996 data, since the UP/SP merger was approved in August 1996. We also excluded shipments with rail transportation charges less than \$20,000 (in 1996 dollars) in order to focus on the major movements. The level of each observation was shipments at the 7-digit Standard Transportation Commodity Code—a classification system used to group similar types of commodities such as grains—between an origin and a destination. The factors that explained the rail rates were generally those related to market structure and regulatory conditions, as well as cost and demand factors.

Market Structure and Regulatory Conditions: We included the variable MERGER to capture the effect of the merger on rates. The extent of rail competition is expected to affect rail rates.⁴ We used a variable that would reflect the difference in rates charged to shippers with competitive options—SP and UP before the merger, and BNSF and UP afterwards—and shippers served solely by one railroad both before and after the

³Although revenue per ton-mile is not the actual rail rate that is paid to transport freight, it is the most widely accepted measure of rates in the rail industry. (See, for example, *Rail Rates Continue Multi-Year Decline*, Surface Transportation Board, Office of Economics, Environmental Analysis, and Administration (2000), and the academic studies cited in this report.)

⁴A full assessment of the effects of mergers on the extent of competition and rates should consider their impact on origin-to-destination rivalry among existing railroads (intramodal competition) as well as competition from nonrail carriers (intermodal competition). We could not include intermodal competition in the analysis because of data limitations. Other sources of competition in the rail industry include geographic or source competition—that is, the ability of customers to use an alternative carrier to obtain similar products from another source (origin or destination)—and product competition—the ability of customers to use an alternative carrier to obtain a substitute product. Since 1999, the Board has excluded geographic and product competition from consideration in determining whether a rail rate can be subjected to regulatory review for practical reasons, and the Board has recently reaffirmed that policy. (See Surface Transportation Board, *Market Dominance Determinations--Product and Geographic Competition*, STB Ex Parte No. 627, Apr. 6, 2001. Note: This decision has been appealed to the United States Court of Appeals for the District of Columbia Circuit.) Board officials said they continue to assess the need to preserve product and geographic competition in the context of rail merger applications.

merger to capture the influence of this fact on rates. The variable is RAILROAD-BNSF.⁵

Cost and Demand Factors: These factors are generally captured by the shipment and shipper characteristics of the traffic.⁶ As in previous studies, we use the following variables to measure the influence of cost and demand factors: variable cost per ton-mile (COST), the weight of shipments (TON), the length of haul (DISTANCE), the annual tonnage shipped between an origin-destination pair (DENSITY), and OWNERSHIP of railcars.⁷

In addition to the explanatory factors mentioned above, we included the following factors: First, we introduced a variable for contract rates (CONTRACT) to account for possible differences between contract rates and noncontract rates. Second, we included a variable to account for the possible effects of the service crisis that arose after the merger and lasted through 1998 (CRISIS). Third, following previous studies, we included the squared terms for the variables TON (TON_SQ) and DISTANCE (DISTANCE_SQ), to account for possible nonlinear relationships between these variables and rates.⁸ We also included dummy variables for the major commodity groups (COMMODITY) where appropriate.

Data Sources, Selection, and Processing

We selected geographic markets that had high concentrations of potential 2-to-1 shippers because of the possibility for harm to competition in those areas. Using the *Carload Waybill Sample*, we performed several data-processing tasks that included matching similar sets of traffic before and after the merger, and selecting the primary commodities that were shipped, based on carloads, for analysis.

⁵The procedure for constructing the traffic for only 2-to-1 shippers and other shippers is detailed in the data section below.

⁶See, for example, Curtis Grimm and Clifford Winston (2000), and Stephen Schmidt, "Market Structure and Market Outcomes in Deregulated Rail Freight Markets," *International Journal of Industrial Organization*, Vol. 19 (2001), pp. 99-131.

⁷Based on previous studies, COST is expected to be positively related to rates, while TON, DISTANCE, and DENSITY are negatively related to rates. The impact of OWNERSHIP is inconclusive. (See, for example, Wilson (1994), and Grimm and Winston (2000)). However, Board officials told us that the use of railroad-owned cars invariably is reflected in higher rates than if shipper-owned cars had been used.

⁸See, for example, Grimm and Winston (2000).

Data Sources

All the data used for the study were constructed from the *Carload Waybill Sample*, which is a sample of railroad waybills (in general, documents prepared from bills of lading that authorize railroads to move shipments and collect freight charges) that are submitted annually by the railroads.⁹ However, there are limitations in using the *Carload Waybill Sample* for rate analysis. Among these limitations is that no specific information is provided about the identity of the shippers. This makes it difficult to identify potential 2-to-1 traffic by shipper name. Also, data for rates for shipments moved under contract between railroads and shippers (called contract rates), which are masked or disguised in the *Carload Waybill Sample*, may be incomplete.¹⁰

Selection of Geographic Markets

We selected the Reno, Nevada, and Salt Lake City, Utah, business economic areas, which are in the Central Corridor and which had high concentrations of potential 2-to-1 shippers.¹¹ Both SP and UP served these two areas prior to the merger; BNSF service was not available in the area at that time.¹² Also, according to BNSF officials, the Central Corridor was relatively less affected by the service crisis that emerged after the UP/SP merger. In addition, UP fully integrated its computer and information systems with SP in the Central Corridor much earlier than in the other regions, making rate and other data there more reliable. However, there

⁹An alternative data source would be a survey of shippers, as was done by Grimm and Winston (2000). However, this approach has the potential problem of shipper bias—that is, shippers could provide biased responses or the self-selected nature of those choosing to respond could result in a sample that is not representative of the group. In addition, there is the potential problem of allocating revenues to multiple origin-destination pairs of traffic. Furthermore, this approach typically yields data for a single year, which means we could have been limited to data for 1999 or 2000 only. Finally, we could have obtained data on all car movements directly from the railroads. Unfortunately, data of sufficient quality on individual potential 2-to-1 shippers were not available for the premerger period.

¹⁰About 70 percent of the tonnage in 1997 moved under contract. Contracts generally offer reduced rates in return for guaranteed volumes. However, even unmasked *Carload Waybill Sample* revenues may not reflect the actual rates paid. This is because negotiated contract volumes may not always materialize and subsequent upward adjustments are thus made to the rates, or, more typically, rebates are offered late in the year or early in the next year when minimum volume commitments have been met. However, according to BNSF and UP officials, the margin of error in using *Carload Waybill Sample* revenues as a surrogate for contract rates is likely to be very small and within a few percentage points of actual rates.

¹¹See figure 1.

¹²BNSF had provided some services in the Reno economic area, in Lassen County, California, hauling primarily lumber/wood in the premerger period. However, this did not affect our analysis, since this traffic was not utilized in our analysis.

are limitations in using the Central Corridor to illustrate the possible effects of the UP/SP merger on rates. According to the Board, BNSF generally had problems ramping-up its trackage-rights service in the Central Corridor. Also, the Reno and Salt Lake City areas are not typical rail hubs, because the traffic to and from these areas is not high volume, compared with other areas, such as the Houston-Gulf Coast area. Despite these limitations, the two selected areas provide an opportunity to illustrate the impact of the UP/SP merger on rates in predominantly potential 2-to-1 situations.

Data Processing

We performed several tasks to organize the *Carload Waybill Sample* for our analysis.¹³ We identified traffic by origin and destination, and at the 7-digit Standard Transportation Commodity Code level separately for periods before the merger and periods after the merger.

We then matched similar sets of railroad traffic existing before and after the merger. The matching involved shipments that we could determine, on a commodity and origin-and-destination basis, that were made in both periods. To help identify traffic associated with BNSF's trackage rights, we also identified the railroad carrier(s) associated with the shipments that we matched for both periods. There were two Class I railroads serving the two geographic areas before the merger (SP and UP). After the UP/SP merger, all the traffic belonging to SP and UP came under the merged UP's sole control, except for potential 2-to-1 shippers and shippers that could take advantage of such provisions as build-in/build-out and new facilities conditions. As a result of the trackage rights imposed by the Board as part of the merger conditions, BNSF obtained access to the potential 2-to-1 traffic, regardless of whether the traffic had been carried by SP or UP prior to the merger. Our matching process was intended to identify this potential 2-to-1 traffic. The following matching was done in the following sequence:

1. SP premerger traffic was matched to BNSF postmerger traffic—this is BNSF trackage rights over SP (BNSF-SP).
2. UP premerger traffic was matched to BNSF postmerger traffic that is still unmatched—this is BNSF trackage rights over UP (BNSF-UP).

¹³Using data provided by the Board, we converted the economic areas used in 1994 and 1995 to the new economic areas issued by the Bureau of Economic Analysis in 1996.

3. SP premerger traffic that was still unmatched was matched to UP postmerger traffic—this is UP traffic over SP (UP-SP).
4. UP premerger traffic that was still unmatched was matched to UP postmerger traffic that is still unmatched—this is UP traffic over UP (UP-UP).

The BNSF-SP and BNSF-UP traffic (henceforth BNSF) consists of only potential 2-to-1 traffic that was served by SP or UP before the merger but served by BNSF in the postmerger period. The UP-SP and UP-UP traffic (henceforth UP) includes potential 2-to-1 traffic as well as non-2-to-1 traffic.¹⁴ However, according to UP officials, the latter traffic substantially comprises shippers that are served solely by one railroad because they could be served in the premerger period only by UP or SP, but not both, and in the postmerger period, only by UP. The two broad types of shippers identified reflect different levels of rail competition. The potential 2-to-1 traffic (served by BNSF) is considered more competitive than the traffic served solely by UP because direct rail competition was preserved or maintained for the potential 2-to-1 shippers, while the traffic solely-served by UP had only indirect competition, which was preserved through build-in/build-out and new facilities conditions.

Finally, because our study focuses on potential 2-to-1 shippers, we included only the commodity groups for which BNSF had presence. Although BNSF officials told us they had not aggressively exercised their trackage rights for coal shipments in the Salt Lake City area, we included these shipments because coal is a major commodity shipped to and from the Salt Lake City area. Summary statistics of the commodities shipped to and from the Salt Lake City and Reno economic areas are provided in tables 4 and 5. The commodities include coal, chemicals, primary metals, farm products (such as corn and wheat), petroleum/coal, food, nonmetallic minerals, lumber/wood, and stone/clay/glass/concrete. Each of these commodities accounted for at least 10 percent of the traffic to or from an area.¹⁵ The share of BNSF's potential 2-to-1 shippers to all shippers was mostly between 10 and 25 percent. (See table 4.) Also, the rail rates

¹⁴Board officials indicated that both BNSF and UP used a mix of former SP and former UP routes to reach potential 2-to-1 shippers. This activity is not expected to affect the matching since the matching is not based on the ownership of the railroad routes that were used.

¹⁵The matched traffic, compared with all the traffic in an area, excluded traffic no longer transported by rail, new traffic, and traffic from new facilities.

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and the direct costs for the total traffic were very similar to the rates for the matched traffic. (See table 5.)¹⁶

¹⁶The rail rates we calculated had some extreme values. This could be due to contract rates for which the guaranteed volume may not have been realized or to local shipments (shipments over very short distances). After examining the distributions of the calculated rates, we deleted the top 1 percent and the bottom 1 percent of the data. The Board had mentioned that outliers represent about one-quarter to one-half of 1 percent of all *Carload Waybill Sample* records.

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**Table 4: Shipments to and From the Salt Lake City and Reno Areas, in Carloads,
1994-99**

Area/Commodity^a	Commodity share of area traffic, by carloads (in percent)^b	BNSF 2-to-1 shippers to all shippers, by carload (in percent)
From the Salt Lake City area^c		
Coal	69	^d
Chemicals	44	15
Primary metals	30	3
To the Salt Lake City area^e		
Coal	52	^c
Farm products	13	22
Chemicals	12	25
Petroleum/Coal	11	25
Food	10	20
From the Reno area^f		
Nonmetallic minerals	79	10
Lumber/Wood	21	21
To the Reno area^g		
Coal	50	10
Chemicals	32	15
Stone/Clay/Glass/ Concrete	10	10

^aThe values reported are averages for 1994 through 1999, excluding 1996.

^bThe share of commodity in area traffic, excluding coal.

^cFor shipments from the Salt Lake City area, the following commodities were excluded: food, petroleum/coal, farm products, metallic ores, miscellaneous manufacturing, and mail/express/other contract traffic.

^dNot applicable.

^eFor shipments to the Salt Lake City area, the following commodities were excluded: stone/clay/glass/concrete, primary metals, lumber/wood, pulp/paper, mail/other contract traffic, furniture/fixtures, and electrical machinery. Waste/scrap was excluded from the analysis because BNSF's share of this traffic was only 1 percent.

^fFor shipments to the Reno area, the following commodities were excluded: food, petroleum/coal, farm products, metallic ores, miscellaneous manufacturing, and mail/other contract traffic. BNSF did not ship coal to the area in 1999, the most recent year of our study.

Source: GAO's analysis of STB's *Carload Waybill Sample*.

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Table 5: Rates and Costs of Shipments to and From the Salt Lake City and Reno Areas, 1994-99

Area/Commodity ^b	Total traffic (in cents)				Matched traffic (in cents) ^a			
	Premerger		Postmerger		Premerger		Postmerger	
	Rate ^c	Cost ^c	Rate ^c	Cost ^c	Rate ^c	Cost ^c	Rate ^c	Cost ^c
From the Salt Lake City area								
Coal	2.8	1.3	2.5	1.1	2.6	1.2	2.8	1.3
Chemicals	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.5
Primary metals	2.2	2.0	2.1	2.3	2.2	2.1	2.1	2.3
To the Salt Lake City area								
Coal	4.3	1.7	4.1	1.6	3.6	1.5	4.1	1.6
Farm products	2.6	2.5	2.6	2.3	2.5	2.2	2.6	2.3
Chemicals	3.8	2.7	3.6	2.6	3.7	2.7	4.1	2.8
Petroleum/Coal	4.2	3.1	3.1	2.4	3.8	2.8	3.7	2.7
Food	3.3	3.2	3.0	2.7	3.0	3.0	3.0	2.8
From the Reno area								
Nonmetallic minerals	2.5	2.6	2.1	2.2	2.8	2.6	2.1	2.2
Lumber/Wood	3.6	2.3	2.9	2.3	3.1	2.0	2.8	2.2
To the Reno area								
Coal	1.7	0.9	1.8	0.9	1.8	1.0	1.8	0.9
Chemicals	3.2	2.4	3.1	2.2	3.1	2.4	3.0	2.1
Stone/Clay/Glass/ Concrete	2.5	2.2	2.9	3.3	2.5	2.1	3.1	2.7

Note: See also notes to table 4.

^aMatched traffic is similar sets of traffic before and after the merger, excluding intermodal.

^bThe values reported are averages for 1994 through 1999, excluding 1996.

^cRate is weighted average of revenue per ton-mile; weights are based on the *Carload Waybill Sample* sampling rates. Cost is weighted average of variable costs per ton-mile; weights are based on the *Carload Waybill Sample* sampling rates.

Source: GAO's analysis of STB's *Carload Waybill Sample*.

Methodology for Estimation and Its Results

The econometric model that we developed was estimated using an appropriate estimation technique. We also discuss the results of our study in terms of the effects on rail rates attributable to the merger and the effects of other factors.

Estimation of the Model

We used a reduced-form rate model of shipping a commodity between an origin and a destination because such a model is useful for analyzing the

impact of a regulatory policy, such as a merger, on rates.¹⁷ The service crisis of 1997 and 1998 could potentially make the estimation results less reliable because the rates may not be at the market-clearing level. However, we included a CRISIS variable to account for this possible structural shift.¹⁸ The reduced-form model we used was as follows:

$$\begin{aligned} \ln \text{ RATE} = & \beta_0 + \beta_1 \text{ MERGER} + \beta_2 \text{ CRISIS} + \beta_3 \text{ CONTRACT} + \beta_4 \ln \text{ COST} + \beta_5 \ln \text{ TON} \\ & + \beta_6 \ln \text{ TON_SQ} + \beta_7 \ln \text{ DISTANCE} + \beta_8 \ln \text{ DISTANCE_SQ} \\ & + \beta_9 \ln \text{ DENSITY} + \beta_{10} \text{ OWNERSHIP} + \beta_{11} \text{ RAILROAD-BNSF} \\ & + \beta_{12} \text{ BNSF*MERGER} + \sum \beta_{13,i} \text{ COMMODITY}_i + \epsilon. \end{aligned}$$

The term “*ln*” is a natural logarithm, and “*i*” is representative of a commodity group.¹⁹ The β ’s are parameters to be estimated, and ϵ is the random-error term. A complete list of the variables used to estimate the regression model is presented in table 6. We could not directly incorporate certain factors into the model primarily because of data limitations.²⁰

¹⁷Furthermore, reduced-form estimates are preferred when determining the net effect of the merger on rates after all other endogenous variables have been adjusted. Also, a reduced-form specification may provide more robust and reliable estimates. (See, for example, Stephen Schmidt (2001).)

¹⁸A similar approach was used in the Grimm and Winston study (see Grimm and Winston 2000).

¹⁹All the variables are expressed in natural logarithms, except for the dummy variables. This is done, following previous studies, to obtain a better fit for the estimates and to help deal with potential problems of heteroscedasticity. (See, for example, Schmidt (2001), and Wilson (1994).)

²⁰For instance, railroad carriers may react to changes in their economic environment by changing rates and/or the quality of services, meaning that service quality information would be useful for explaining rates. Also, because shippers might incur additional investment costs (for such activities as extending track and adding storage capacity), rates could be affected by such behavior. (See, for example, *Traffic World*, July 17, 2000, p. 11).

Table 6: List of Variables Used in Our Econometric Analysis of Rail Rates

Variable	Definition
RATE	Real revenue per ton-mile (adjusted by the Gross Domestic Product Deflator), in 1996 dollars
MERGER	A dummy variable, equals 1 if postmerger period (1997-99), 0 otherwise
COST	Variable costs per ton-mile (in 1996 dollars), as defined by the Board's Uniform Rail Costing System (URCS)
TON	Billed weight of shipments (in tons)
TON_SQ	Squared value of TON
DISTANCE	Length of haul (in miles)
DISTANCE_SQ	Squared value of DISTANCE
DENSITY	Total tonnage shipped from origin to destination (in tons)
OWNERSHIP	A dummy variable, equals 1 if railcars are railroad-owned, 0 otherwise
RAILROAD-BNSF	A dummy variable, equals 1 if traffic is potential 2-to-1 and postmerger railroad carrier is BNSF, 0 otherwise
CRISIS	A dummy variable, equals 1 if crisis period (1997-98), 0 otherwise
CONTRACT	A dummy variable, equals 1 if rate is based on contract, 0 otherwise
BNSF*MERGER	Interaction term for RAILROAD-BNSF and MERGER—equals 1 if traffic is potential 2-to-1, postmerger railroad carrier is BNSF, and the period is postmerger, 0 otherwise
COMMODITY-COAL ^a	A commodity dummy variable, equals 1 if major commodity group is coal, 0 otherwise

^aSimilar dummy variables were created for the other major commodity groups.

We estimated the regression model using the SAS SURVEYREG procedure, since the data are from stratified samples. This procedure is appropriate for dealing with a stratified sample because it adjusts both the coefficients and the standard errors of the estimates to account for the sampling design.²¹ The econometric model was run for different samples—shipments of the primary commodities to or from an economic area, and for subsamples of individual commodities and shippers.

We tried different specifications of our basic model to check the robustness of our key model results. We found that the results were not

²¹We preferred the SURVEYREG procedure to the Weighted Least Squares method, which adjusts only the coefficients and assumes a simple random sampling design. However, the econometric results were generally consistent with either method, probably because most of the observations were concentrated in only one or two sampling strata. With the SURVEYREG procedure, we could not check for possible problems of heteroscedasticity or serial correlation because these tests are not available for this procedure. We believe that since the data are from a stratified sample, it is more appropriate to use SURVEYREG, which is consistent with the data design.

highly sensitive to model specification. While we used a reduced-form specification, it is still possible that some of the explanatory variables on the right-hand side of the equation may be endogenous. Since there are no available instruments in a reduced-form model, we could not perform the usual test.²² Rather, we checked the robustness of our results by excluding possible endogenous variables.²³ In particular, when DENSITY was excluded from the model, our findings regarding the effects of mergers on rates and the effects of the other factors on rates were essentially unchanged. It is also likely that COST is related to the variables TON, DISTANCE, and OWNERSHIP, which could produce unreliable results. In other specifications of the model, we eliminated the COST variable, but our key findings were robust to such specifications.

Econometric Results of Effects of Merger and Other Factors on Rates

Summaries of the effects of the merger on rates, based on the econometric results, are presented in table 7.²⁴ The rates for shipments to and from the Reno and Salt Lake City areas generally would have declined for all the shippers as a result of the merger, especially in the Salt Lake City area. Although the effects of the merger on rates depend on both the potential cost savings from the merger and the exercise of any enhanced market power by the railroads, the UP/SP merger is generally expected to lower rates in those areas where the Board imposed trackage rights.

²²This is a Hausman test. See J. Hausman, "Specification Tests in Econometrics," *Econometrica*, Vol. 46 (1978), pp. 1251-1271.

²³See, for example, Wilson (1994) for a similar approach.

²⁴The complete econometric results are presented in tables 8-11. The overall econometric results are very significant, based on the significance levels of the prob-F values. The econometric results are presented for only the commodities that are discussed in table 1 in the text above.

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Table 7: Changes in Rail Rates, for Shipments to and From the Salt Lake City and Reno Areas

In percent					
Shipments	Commodity	Shipper/post merger railroad^a	Rate changes due to merger^b	Rate changes due to other factors^c	Overall changes in rates^d
From the Salt Lake City area	Coal	All shippers/UP	-10	20	10
	Chemicals	All shippers/BNSF & UP	-6	16	10
	Chemicals	BNSF v UP	-16	^e	^e
To the Salt Lake City area	Coal	All shippers/UP	-8	23	15
	Farm products	All shippers/BNSF & UP	-5	6	1
	Farm products	BNSF v UP	0.3	^e	^e
From the Reno area	Nonmetallic minerals	All shippers/BNSF & UP	4	-26	-22
	Nonmetallic minerals	BNSF v UP	6	^e	^e
To the Reno area	Chemicals	All shippers/BNSF & UP	21	-27	-6
	Chemicals	BNSF v UP	4	^e	^e

^aBNSF & UP is for all the shippers—potential 2-to-1 shippers served by BNSF and shippers served solely by UP. On the other hand, BNSF v UP is the changes in BNSF rates less changes in UP rates. The results for the rate changes are based on the estimated coefficients for BNSF*MERGER from the regression equations in tables 8-11. Since the dependent variable is in logs, the percentage change in rates between the BNSF shippers and the UP shippers as a result of the merger is obtained as: $[\exp(\beta) - 1] \times 100$, where “exp” is an exponential, and β is the estimated coefficient for BNSF*MERGER.

^bThe results for the rate changes due to the merger are based on econometric results, using the estimated coefficients for MERGER from the regression equations in tables 8-11. See also note “a” above.

^cThe effects of changes in rates due to other factors are calculated as the overall changes in rates less the merger effects on rates.

^dThe overall changes in rates, which are unweighted, are based on a mean-difference test that subtracts the premerger rates from the postmerger rates. The BNSF v UP values are not available for the mean-difference tests because the samples were unbalanced (unequal sample sizes) for the postmerger and premerger periods. For the overall changes in rates and the rate changes due to the merger, values in bold/italics are significant at the 5-percent level or better.

^eNot applicable.

Source: GAO’s analysis of STB’s *Carload Waybill Sample*.

We also compared the effects of the merger on rates charged to potential 2-to-1 shippers served by BNSF to rates charged to shippers served solely by UP in the same general locations. In particular, the results show that the rates charged to the potential 2-to-1 shippers served by BNSF were lower than the rates charged to the shippers served solely by UP for shipments of chemicals from the Salt Lake City area. The rate differentials for the Reno area were positive, but none was statistically significant. The result that rates for the potential 2-to-1 shippers served by BNSF were generally lower than rates charged to shippers served solely by UP is consistent with demand-based differential pricing, which reflects the differing transportation alternatives available to shippers.

We found that the effects of other factors on rail rates during the period are generally consistent with what has been found in previous studies. (See results in tables 8 through 11 for all commodities.) We used the econometric results for all the commodities because most of these effects are not commodity-specific and can be better captured across commodities. The impact of COST on rates was positive and significant for traffic in each of the selected areas, meaning that rates were lower (or higher) as costs decreased (or increased).²⁵ TON had mixed results, meaning that larger shipment volumes sometimes resulted in higher or lower rates. DISTANCE generally decreased rates.²⁶ DENSITY, which captures the volume of traffic on the route used for a particular shipment, unambiguously decreased rates. This effect is consistent with decreasing costs in railroad operations, since increased shipment levels over a rail route spread fixed costs over larger volumes and reduce rates.²⁷ OWNERSHIP had mixed results. CONTRACT rates were generally lower. Finally, the impact of CRISIS on rates was generally inconclusive. This is not unexpected, since most shipments are under contract and the crisis affected primarily the services that were provided rather than the rates.

²⁵The estimated coefficients were also reasonable, between zero and one, except for shipments from the Reno area.

²⁶The squared terms for TON (TON_SQ) and DISTANCE (DISTANCE_SQ) were generally significant, implying that these variables had nonlinear relationships with rates.

²⁷Other previous studies have found evidence of decreasing costs. See, for example, Burton (1993).

Direction of Rate Changes
Due to a Merger Could
Differ From Overall
Changes in Rates

To compare the changes in rates due to the merger that we obtained from the econometric analysis to the overall changes in rates, we separated the overall changes in rates into changes due to the merger and changes due to other factors, such as costs and volume of shipments. The overall changes in rates were estimated using a difference in means analysis that compares the rates in the postmerger period with rates in the premerger period.²⁸

We found that the overall changes in rates could be in the opposite direction from the rate changes due to the merger. For instance, for coal shipments from the Salt Lake City area, the overall changes in rates were about 10 percent higher, while the rate changes due to the merger alone would have been about 10 percent lower. On the other hand, for shipments of chemicals to the Reno area, the overall changes in rates were about 6 percent lower, while the rate changes due to the merger alone would have been about 21 percent higher. These illustrations indicate that a complete analysis of merger-related rate changes could benefit from the application of an analytical approach that identifies and determines the separate effects of the various factors, including those associated with a merger, affecting rail rates.

²⁸The mean-difference test uses the TTEST procedure in SAS.

**Appendix III: Description and Discussion of
Econometric Model Used to Conduct Rail Rate
Analysis**

Table 8: Econometric Results of Rail Rates, for Shipments From the Salt Lake City Area

Variable	All commodities^a	Coal UP	Chemicals BNSF & UP	Chemicals BNSF v UP
MERGER	-0.0658 [0.0001]	-0.1057 [0.0001]	-0.0640 [0.0018]	-0.0312 [0.1728]
CRISIS	0.0170 [0.1164]	0.0049 [0.6897]	0.0535 [0.0004]	0.0524 [0.0005]
CONTRACT	-0.0773 [0.0001]	-0.1438 [0.0001]	0.0379 [0.1076]	0.0495 [0.0382]
COST	0.3286 [0.0001]	0.1145 [0.0112]	0.1501 [0.0001]	0.1141 [0.0012]
TON	0.0697 [0.2325]	4.2914 [0.0001]	-0.8073 [0.0001]	-0.8560 [0.0001]
TON_SQ	-0.0080 [0.0774]	-0.2786 [0.0001]	0.0800 [0.0001]	0.0836 [0.0001]
DISTANCE	-0.7108 [0.0001]	0.5624 [0.0001]	-1.9305 [0.0001]	-1.9862 [0.0001]
DISTANCE_SQ	0.0190 [0.0010]	-0.0855 [0.0001]	0.1060 [0.0001]	0.1094 [0.0001]
DENSITY	-0.0268 [0.0001]	0.0270 [0.0001]	-0.0268 [0.0001]	-0.0259 [0.0001]
OWNERSHIP	-0.0089 [0.5234]	-0.0809 [0.0001]	0.0612 [0.0010]	0.0690 [0.0002]
RAILROAD-BNSF	-0.0134 [0.4503]	^b	0.0572 [0.0098]	0.1585 [0.0001]
BNSF* MERGER	^b	^b	^b	-0.1703 [0.0001]
Chemicals	-0.3939 [0.0001]	^b	^b	^b
Primary metals	-0.1221 [0.0005]	^b	^b	^b
INTERCEPT	1.7921 [0.0001]	-19.6003 [0.0001]	7.0212 [0.0001]	7.2153 [0.0001]
Prob-F	0.0001	0.0001	0.0001	0.0001
R ²	0.64	0.84	0.71	0.71
Sample size	6359	2227	2323	2323

Note: P-values are in brackets.

^aIncludes all chemicals, primary metals, and coal shipments. Coal was the excluded commodity dummy.

^bNot applicable.

Source: GAO's analysis of STB's *Carload Waybill Sample*.

**Appendix III: Description and Discussion of
Econometric Model Used to Conduct Rail Rate
Analysis**

Table 9: Econometric Results of Rail Rates, for Shipments to the Salt Lake City Area

Variable	All commodities^a	Coal UP	Farm products BNSF & UP	Farm products BNSF v UP
MERGER	0.0628 [0.0023]	-0.0838 [0.0001]	-0.0462 [0.0360]	-0.0468 [0.0203]
CRISIS	-0.0681 [0.0006]	-0.0084 [0.5394]	-0.0280 [0.2466]	-0.0281 [0.2517]
CONTRACT	-0.0812 [0.0001]	-0.1454 [0.0001]	0.1727 [0.0001]	0.1729 [0.0001]
COST	0.5191 [0.0001]	0.0979 [0.0077]	0.5313 [0.0001]	0.5315 [0.0001]
TON	-0.4302 [0.0001]	0.7310 [0.0037]	-0.6961 [0.0002]	-0.6960 [0.0002]
TON_SQ	0.0387 [0.0001]	-0.0581 [0.0013]	0.0614 [0.0001]	0.0614 [0.0001]
DISTANCE	-0.6732 [0.0001]	0.4639 [0.0001]	2.5095 [0.0001]	2.5124 [0.0001]
DISTANCE_SQ	0.0263 [0.0024]	-0.0733 [0.0001]	-0.2309 [0.0001]	-0.2312 [0.0001]
DENSITY	-0.0442 [0.0001]	0.1095 [0.0001]	-0.0392 [0.0001]	-0.0393 [0.0001]
OWNERSHIP	-0.0430 [0.0602]	-0.2059 [0.0001]	-0.0621 [0.0012]	-0.0622 [0.0017]
RAILROAD-BNSF	-0.1216 [0.0001]	b	-0.1367 [0.0001]	-0.1379 [0.0001]
BNSF* MERGER	b	b	b	0.0025 [0.9534]
Farm products	0.3243 [0.0018]	b	b	b
Chemicals	0.5001 [0.0001]	b	b	b
Petroleum/Coal	0.3969 [0.0002]	b	b	b
Food	0.3514 [0.0011]	b	b	b
INTERCEPT	2.9016 [0.0001]	-6.6043 [0.0001]	-5.6704 [0.0001]	-5.6781 [0.0001]
Prob-F	0.0001	0.0001	0.0001	0.0001
R ²	0.63	0.88	0.84	0.84
Sample size	3079	954	492	492

Note: P-values are in brackets.

^aIncludes farm, chemicals, petroleum/coal, food, and coal shipments. Coal was the excluded commodity dummy.

^bNot applicable.

Source: GAO's analysis of STB's *Carload Waybill Sample*.

**Appendix III: Description and Discussion of
Econometric Model Used to Conduct Rail Rate
Analysis**

Table 10: Econometric Results of Rail Rates, for Shipments From the Reno Area

Variable	All commodities ^a	Nonmetallic minerals	Nonmetallic minerals
		BNSF & UP	BNSF v UP
MERGER	-0.0230 [0.4164]	0.0361 [0.3093]	-0.1209 [0.0043]
CRISIS	-0.0235 [0.2494]	-0.0035 [0.8912]	0.0324 [0.2817]
CONTRACT	-0.0162 [0.5981]	-0.0212 [0.5720]	-0.1392 [0.0072]
COST	1.1828 [0.0001]	1.2656 [0.0001]	^b
TON	0.6393 [0.0001]	0.7497 [0.0001]	-0.4051 [0.0106]
TON_SQ	-0.0525 [0.0001]	-0.0599 [0.0001]	0.0303 [0.0566]
DISTANCE	-1.1022 [0.0527]	-1.8058 [0.0185]	-4.0021 [0.0001]
DISTANCE_SQ	0.0749 [0.0685]	0.1296 [0.0204]	0.2693 [0.0001]
DENSITY	-0.0436 [0.0001]	-0.0467 [0.0001]	-0.0598 [0.0001]
OWNERSHIP	-0.1080 [0.0001]	-0.1423 [0.0001]	0.0146 [0.7428]
RAILROAD-BNSF	0.0424 [0.2572]	0.0428 [0.4405]	-0.1076 [0.2325]
BNSF* MERGER	^c	^c	0.0627 [0.5488]
Lumber/Wood	0.2609 [0.0001]	^c	^c
INTERCEPT	3.4396 [0.0777]	5.6220 [0.0292]	12.6568 [0.0001]
Prob-F	0.0001	0.0001	0.0001
R ²	0.60	0.55	0.24
Sample size	933	708	708

Note: P-values are in brackets.

^aIncludes nonmetallic minerals and lumber/wood. Nonmetallic minerals was the excluded commodity dummy.

^bThe COST variable was deleted from the regression because it was very significantly correlated with BNSF*MERGER. See also footnote 25.

^cNot applicable.

Source: GAO's analysis of STB's *Carload Waybill Sample*.

**Appendix III: Description and Discussion of
Econometric Model Used to Conduct Rail Rate
Analysis**

Table 11: Econometric Results of Rail Rates, for Shipments to the Reno Area

Variable	All commodities^a	Chemicals BNSF & UP	Chemicals BNSF v UP
MERGER	0.1103 [0.0001]	0.1914 [0.0001]	0.1902 [0.0001]
CRISIS	-0.0027 [0.8921]	-0.0231 [0.3418]	-0.0235 [0.3361]
CONTRACT	0.0633 [0.0146]	0.1291 [0.0001]	0.1278 [0.0001]
COST	0.1691 [0.0094]	0.2891 [0.0047]	0.2996 [0.0047]
TON	-1.0161 [0.0001]	-0.9636 [0.0003]	-0.9458 [0.0004]
TON_SQ	0.0954 [0.0001]	0.0994 [0.0001]	-0.0978 [0.0002]
DISTANCE	-1.3817 [0.0001]	-1.9342 [0.0001]	-1.9242 [0.0001]
DISTANCE_SQ	0.0836 [0.0004]	0.1236 [0.0001]	0.1231 [0.0001]
DENSITY	-0.0845 [0.0001]	-0.1070 [0.0001]	-0.1072 [0.0001]
OWNERSHIP	0.0199 [0.5562]	-0.0888 [0.2386]	-0.0889 [0.2353]
RAILROAD-BNSF	-0.2071 [0.0001]	-0.1760 [0.0001]	-0.2039 [0.0005]
BNSF* MERGER			0.0352 [0.5691]
Chemicals	0.0600 [0.1023]		
			b
INTERCEPT	5.9309 [0.0001]	8.1804 [0.0001]	8.1334 [0.0001]
Prob-F	0.0001	0.0001	0.0001
R ²	0.42	0.41	0.41
Sample size	1116	866	866

Note: P-values are in brackets.

^aIncludes chemicals and stone/clay/concrete/glass. Stone/clay/concrete/glass shipments was the excluded commodity dummy.

^bNot applicable.

Source: GAO's analysis of STB's *Carload Waybill Sample*.

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