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SELECTED RAILROAD CONTRIBUTIONS TO THE UNITED STATES: AN ECONOMIC AND HISTORICAL REVIEW

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ABSTRACT

Railroads were instrumental in opening the western U.S. in the 19th century. The main incentive provided for the railroads to connect San Francisco, CA and Omaha, NB were land grants out of the public domain. In a period of 21 years (1850-1871), 174 million acres were patented (deeded) primarily to what would become four major railroads. Many acres were returned to the government, some were sold and many others were retained or disposed of through holding companies. This paper emphasizes an oft-overlooked reality: that in many cases the railroads leveraged these land grants in support of the growth and prosperity of the U.S. and that privatizing these lands to the railroads was the most productive use of those resources at that point in history. Further, those grants continue to bear fruit in the present day. We contend that the counterfactual, one in which those lands remained in the public domain and under control of the federal government, would not have yielded anywhere near the development and wealth that they created under the railroads' control.

INTRODUCTION

Many are aware that the major railroads received large land grants in the 1800s. Federal and state land grants to the railroads during the 19th century totaled 174 million acres. (Ellis, 1946) For a sense of magnitude, that is larger than the state of Texas (172 million acres). That these grants were large is not in question. Whether they were, on balance, beneficial for the American populace is. The appropriate policy to pursue in regard to these grants in the present day is closely tied to this question.

Railroads in some form are listed as having existed since 1830, or 190 years of history. Any industry with almost two centuries of history is bound to have baggage. One interest group is served while another is shunned or hurt. Characters who have questionable values and morals come and go. Governments make decisions that serve special interests rather than those of the people in general. However, critiques of rail grants focus almost exclusively upon the costs of the policy and overlook the benefits. It is our goal here to provide a richer investigation of the reality and selective net benefit of these grants. We focus mainly on railroads

that were established west of the Mississippi River and the grants that were enacted by the U.S. Congresses of 1862 and 1864.

We find that, while the grants were large in the 19th century, only a small fraction of the land grants originally patented still remain under railroads' control today. We also find that the value that the railroads have generated, in numerous domains, is considerable and most plausibly outweighs the costs to the American people as a whole.

THE COMMON PERSPECTIVE

Many publications and much commentary would have the reader believe that the railroads are immoral holders of public lands. This perspective is based upon claims that they treated workers poorly, that in the modern age their diesel-electric locomotives are exacerbating climate change, and that railroads are monopolists with a tendency toward bribery and deceit.

Some examples of these critiques of the railroads are as follows:

As many know, the railroads used a considerable number of Asian workers, primarily Chinese, for rail construction. Though certainly not limited to the railroads, this practice elicited sufficient public outrage as to result in the Chinese Exclusion Act (1882). Of course, the outrage at that time was not about how poorly Chinese workers were treated by the railroads but rather their willingness to work for low wages. In the modern age, concern has shifted away from the impact of Chinese workers' impact upon wages at the time and to how harshly the workers were treated.

Additionally, the land grants and general management of the railroads in the 1800s is often said to have been a hotbed of corruption. One author states unequivocally that "At the center of national corruption, both financial and political, were particular corporations: the railroads. . . . An important subgroup of the railroads—the trans-continentals chartered to cross the western United States—were particularly open to corruption." (White, 2003)

Another take says the possibilities of power involved in such a concentration of land ownership, irrespective of the timber, hardly require discussion. The danger of abuse of that power, in the absence of restrictive regulation, is obvious. This danger, moreover, is greatly increased because a few of the largest owners of this land also occupy dominating positions in railroad transportation over great sections of the country." (U.S. Bureau of Corporations, 1913-1914)

On the environmental front, the railroads have been targeted for environmental concerns in the early 21st century. For example, the California Air Resources Board examined "...toxic air contaminants..." emitted from a Union Pacific railyard in Oakland, California. Sources of these emissions were "...locomotives, cargo handling equipment, on-road trucks, and off-road vehicles." (Mahmood, 2008).

It's clear that railroads took advantage of opportunities to bend the rules in their favor. "In the Act of July 2, 1864, Congress inserted a provision which required the railroad companies to pay the cost for surveying, and conveying the lands, previous to the

issuance of patents" (McAllister, 1939). The federal government did not have the funds to pay for surveying, therefore the surveyors were essentially railroad employees. It was the 'fox guarding the chicken coop.'

In all of this, the reality is, as usual, a bit more nuanced than the prevailing perspective would have us believe. Clearly, there were costs of and harm from the rail expansion. However, there were also large benefits.

NINETEEN DECADES OF AMERICAN HISTORY

The railroads have witnessed and, in many instances, contributed to the evolution of the United States. For a sense of the timeframe and history involved, note the following events from 1860 forward:

- 1861 – Abraham Lincoln becomes president.
U.S. Civil War begins.
- 1865 – Lincoln assassinated. U.S. Civil War ends.
- 1872 – Yellowstone National Park established.
- 1898 – Spanish-American war.
- 1903 – Ford Motor Company formed.
First World Series.
- 1914 – World War I.
- 1920 – First radio broadcast.
- 1927 – First transatlantic flight.
- 1929 – Great Depression begins.
- 1934 – Dust Bowl begins.
- 1941 – U.S. enters World War II.
- 1950 – Korean War begins.
- 1957 – Russians launch Sputnik.
- 1962 – Cuban missile crisis.
- 1968 – President Robert F. Kennedy assassinated.
- 1969 – Neil Armstrong walks on the moon.
- 1979 – Three Mile Island nuclear accident.
- 1991 – Gulf War.
- 2001 – Terrorist attacks in the U.S.

THE 1862 AND 1864 LAND GRANTS

Recall that this is a time in the eastern U.S. where the Civil War is underway. Also during this time, Congress and presidential candidates were searching for a way to 'open the west' (west of Omaha,

Nebraska). They envisioned a transcontinental railroad that would operate from San Francisco, California to Omaha, Nebraska. The problem was that there were insufficient funds in the federal treasury to support this huge endeavor directly. The solution arrived at was to provide land out of the public domain as an incentive for railroad construction.

The 1862 Act was entitled, “An act to aid in the construction of a railroad and telegraph line from the Missouri River to the Pacific Ocean, and to secure to the government the use of the same for postal, military and other purposes.” (37th U.S. Congress, 1862). The 1864 Act (38th U.S. Congress, 1864) was an extension of the 1862 Act and offered an even greater quantity of land.

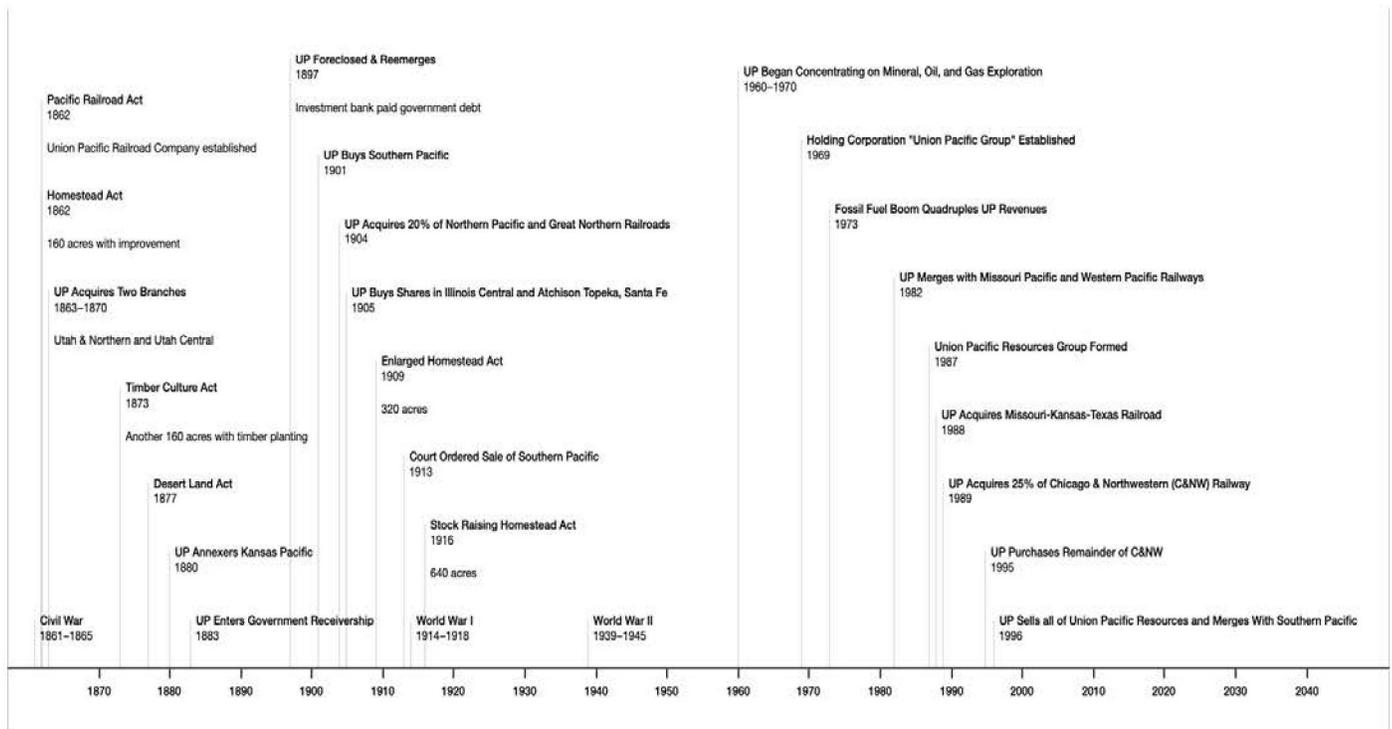
For both Acts, “Right of way was granted through the public lands to the extent of 200 feet in width on each side of the track, and a grant of land to the

amount of five (increased to ten by the act of 1864) alternate sections per mile on each side of the road within the limits of 10 (increased to 20) miles on each side of the road, not sold, reserved, or otherwise disposed of by the United States at the time of the definite location of the line. All mineral lands were excepted from the operation of this act.” (Commissioner of Railroads, 1883, p. 514) From 1850 to 1871, the railroads received around than 174 million acres of public land.

AN EXAMPLE OF LAND ACQUISITION AND DISPOSITION

The railroads did not necessarily want or need 174 million acres. Many acres were desolate and lacked any chance of being turned to productive ends. Obstacles included lack of access to water and poor soil conditions and meant no potential farmer would consider the land as a possible homestead. This made it improbable that the railroads could sell

**FIGURE 1
HIGHLIGHTS OF UNION PACIFIC HISTORY AND MILESTONES**



**TABLE 1
MERGERS AND ACQUISITIONS ACTIVITY**

ACRES (MILLIONS)	RAILROAD
7.7	Northern Pacific
7.1	Kansas Pacific
6.8	Southern Pacific
1.1	Chicago & North Western
Total	22.7

these lands and such an inability to sell defeated the purpose of the Act and thereby the ability of the federal government to subsidize railroad construction. However, an unforeseen result of this reality was that railroads had a vested interest in the development of the areas in which the land was located. Approximately 52% of railroad land grants (92 million acres) eventually came under the control of just four railroads (Wilner, 1981). Those railroads include: the Northern Pacific, Santa Fe, Southern Pacific and the Union Pacific. Figure 1 depicts some highlights of Union Pacific history and milestones.

Over a period of approximately 134 years, the Union Pacific railroad acquired over 22 million acres. This number includes the original grants enacted by congress, but also grant land from the mergers and acquisitions that occurred over this period of time. Table 1 illustrates the M&A activity that helped contribute to this total.

If the focus is narrowed to the state of California, by 1878 11 million acres had been granted to the railroads, although by 1956 the amount held by rail companies had declined to 2 million acres (Sanderson, 1958). In the interim, some of this land was returned to the federal government, some was sold and some reallocated into railroad-affiliated holding companies. Though smaller today, these grants have served to help keep rail companies out of bankruptcy court and off of the public dole even to the present day (Gurney, 2019).

VALUE CREATION

The ostensible purpose of land grants was to encourage the construction of transcontinental rail links and to open up the west. This was certainly deemed an acceptable goal at the time and it seems likely that rail grants at least expedited the accomplishment of this goal. In addition, however, rail companies made contributions well beyond this narrow goal. These contributions include, but are not limited to, agriculture, energy, higher education, real estate development, telecommunications, and, perhaps most importantly, simply getting land into productive use. Following is a discussion of some of these benefits for each category.

Agriculture

A conservative estimate is that the Southern Pacific Railroad (SPRR) controlled 3 million acres of land by 1900. Being dependent on the boom and bust cycles of gold mining was not an option for long-term prosperity so the railroad became instrumental in developing California's agricultural industry. The railroad sold land to prospective farmers and brought in federal and state experts on agriculture to educate and train the budding farming community. In addition, the SPR built much of the irrigation system in California.

As an example of the depth of the commitment the railroad had to California's agricultural sector, in 1905 the Colorado River breached an irrigation wall and began to drain into the Imperial Valley. The state agency in charge was unable to stop the flooding but the railroad stepped in and spent over

\$1,600,000, or roughly \$48 million in today's dollars, to contain the river and stop the flooding in February 1907 (Orsi, 1975) with no apparent request for repayment.

The railroad sold many thousands of acres in small tracts to anyone who wished to establish a farm. They would finance the purchase of the land, train the farmer in state-of-the-art agronomy and provide the necessary transportation to get the product to market. "Moreover, especially after the 1880's, the financial and organizational resources of the Southern Pacific were channeled into effective programs to achieve these goals. The railway collected and disseminated scientific information, assisted farm groups in organizing and developing their markets, exerted its considerable corporate muscle to wrest more agriculturally-oriented decisions from California's political system, and sponsored social and economic development upon its original grants, as well as lands it purchased specially for that purpose" (Orsi, 1975). This is an excellent example of self-interest harnessed for public good, something exemplified by, but not limited to, this case in California.

Energy

The 1864 Pacific Railroad Act resulted in 4,582,520 acres in the Wyoming Territory (Nickerson, 2014). A wholly-owned subsidiary of the Union Pacific Railroad was the Union Pacific Resources Group (UPRG), established in 1987. UPRG was the top driller of wells in the U.S. between 1992 – 1995 and generated \$1.45 billion in revenues in 1995 (Klann, 1996). Using right-of-ways granted by Congress, pipeline companies contracted with the railroad to ship oil and gas along 1,871 miles of railroad tracks.

In the present day, Burlington Northern Santa Fe and Union Pacific move virtually all of the coal out of Wyoming's Powder River Basin. Although these volumes have declined with the changeover to natural gas and renewables. At its peak the Union Pacific loaded 26 coal trains per day. The level of railroad infrastructure necessary to serve this demand was "...one of the largest railroad construction projects in modern times" (PR Newswire,

1998).

Higher Education

Leland Stanford was one of the Big Four who built the western half of the transcontinental railroad. He was also the governor of California in the early 1860's. Leland and wife, Jane Lathrop Stanford founded Leland Stanford Jr. University in memory of their son. It opened in the fall of 1891.

Today, Stanford University is a world renowned institution comprising seven schools, more than 16,000 students from 91 countries and 1,800 postdoctoral scholars (Stanford University). By 2003, the campus employed three Nobel laureates, 4,000 faculty, staff and students, over 50 bioscience start-ups and 10 venture capital firms on or around the campus.

By 1910 the Southern Pacific Railroad was encouraging employees to enroll in International Correspondence courses and courses offered through the University of California Extension Division. The railroad offered an employee stock subscription that provided for monthly installment payments (Hofsommer, 1986).

In 1995 the University of California at San Francisco was a land-locked campus and could not afford the real estate to expand. It was considering splitting the campus by opening another campus outside of the city. The Southern Pacific Railroad, now owned by Union Pacific Railroad, had real estate that abutted the San Francisco campus. Through Union Pacific's subsidiary, Catellus, the campus was given 30 acres of land which at that time was valued at \$170 million (US Fed News Service, 2013).

Real Estate Development

Southern Pacific Railroad spun-off much of its land holdings in 1990 to a new subsidiary called Catellus Development Corporation. Catellus received 855,000 acres of land, predominately in California. In 25 years, Catellus has moved forward to develop industrial, commercial, retail and residential properties in California and 10 other states. Many of these development projects are quite significant. For

example, the 303-acre Mission Bay project in San Francisco has a built-out value approaching \$3 billion, and this sum is after subtracting 49 acres for parks (Barista, 2004).

Contrast this largess with the fact that the Union Pacific entered into receivership (bankruptcy) in 1883 and did not reemerge until 1897. Add to this that the subsequent decades were full of ups and downs for rail haulage. The advent of commercial air travel took a heavy toll on most railroads in regard to passenger traffic and led many of them to the edge of bankruptcy. Similarly, the opening of the Interstate Highway system coupled with relatively inexpensive oil prices took a toll on railroad freight revenues (Steel Interstate Coalition). In the present day, railroad revenue is being negatively impacted by the shift from coal to natural gas. For example, annual shipments of coal by rail to the electric power sector declined by 42% in ten years, from 705 million short tons in 2008 to 406 million short tons in 2018 (U.S. Energy Administration, 2020).

Enter the land grants to help soften some of these market shocks. The ability of the railroads to divest themselves of land holdings was always a stabilizer for them, and one that at least the Union Pacific has been increasingly using in recent years. A cursory review of railroad land sale dispositions in recent

years is shown below in Table 2.

Telecommunications

In 1970, Southern Pacific (railroad) created a subsidiary, the Southern Pacific Communications Company (SPCC). The mission of the SPCC was to leverage the company’s microwave communications system by providing new communication transmission services to business, government and other customers. By 1974, the SPCC became the first common carrier communications company to offer coast-to-coast voice transmission by microwave. In 1983, GTE acquired SPCC and renamed it GTE Sprint Communications.

Over the next three decades Sprint went through a series of acquisitions and divestitures. The latest development with Sprint occurred in the summer of ’19, when Sprint and T-Mobile entered into a \$26 billion merger.

Putting Land to Productive Use

It is easy to forget, in this day and age, that a major concern of the federal government in the 1800s was to find ways of divesting land. The Louisiana Purchase was a massive area and it was clear to everyone at the time that this land would best be used by private individuals. Most of the colonies had large claims, many of which conflicted, over

**TABLE 2
RAILROAD LAND SALE DISPOSITIONS**

Year(s)	Value of Sale	Railroad
1988 - 1996	\$2,200,000,000	Southern Pacific Railroad
1990	\$500,000,000	Union Pacific Railroad
1994	\$405,000,000	Union Pacific Railroad
2009	\$116,000,000	Union Pacific Railroad
2011	\$17,500,000	Union Pacific Railroad/Catellus
2015	\$110,000,000	Union Pacific Railroad
2016	\$67,000,000	Union Pacific Railroad

CONCLUSIONS

land west of their operating borders. In the forming of a new nation under the Articles of Confederation and the Constitution these claims were ceded to the federal government. "Beginning with the Land Ordinance of 1785, the clear intent was to divide these lands into parcels for disposal to private parties. The federal and state governments were to benefit from the proceeds of land sales. More importantly, they were to benefit from the economic development which was to result from the wise disposition of these lands into private hands. The national government did resist the unauthorized settlement of the public lands, but in the interest of controlled and profitable disposition, not in the interest of public retention of those lands." (Huffman, 1989)

Through rail grants, various homestead acts, and other federal policy, the effort was to find ways of clearing federal holdings, not of maintaining or enlarging them. Of course, the reality is that the federal government largely failed in this aspect. Today, more than 27% of all land in states west of the Mississippi is still in the ownership of the federal government (Authors' calculations based upon Department of Interior figures). It was not until the Progressive Era (1890s-1920s), that the idea of the federal government retaining ownership and engaging in active management was first broached. In retrospect, this movement can be seen to have been, at least in part, a means to avoid recognizing how abjectly the federal government had failed at divesting itself of land holdings.

If all of the lands granted to the railroads had been retained by or returned to the federal government, this percentage would rise to somewhere between 33% and 40%. From a policy perspective, it is very difficult to imagine that the federal government would have used this additional land more effectively over this period than the private sector did. In fact, given the complexity of managing federal lands for competing ends (Nelson, 1995; Hayes, 2018) it is quite likely that the biggest benefit gleaned from rail land grants was getting land into the private sector where market forces could work to allocate land to higher valued use.

The persistent view that the land grants were a form of theft, or that the existence of the trans-continentials was at best a necessary evil is clearly unwarranted. In fact, the land was bartered to construct a railroad to the Pacific Ocean and the Congress of the United States set the parameters.

The question becomes how one can make a statement or create a movement to try to reclaim land that was lawfully patented (deeded) over a century and a half ago. With the passage of such a time period, the railroads themselves may not have an accurate inventory of what land remains. Even more to the point, if it were practical, would it even be desirable to increase federal holdings west of the Mississippi? The onus is clearly upon those advocating such a policy to make a compelling case.

What should be highlighted is the role that the railroads and their lawfully acquired lands have played to advance the U.S. Out of self-interest, the railroads helped facilitate California to become America's breadbasket. They provided thousands of jobs and millions of dollars in taxes and helped supply energy for a growing nation. Biomedical discoveries may be around the corner indirectly due to the land, infrastructure and research funding undertaken by the railroads. The railroads have used the granted lands and added value in everything from constructing research parks to coastal intermodal shipping facilities.

The next time your cell phone rings while you're just getting ready to eat a California plum, while sitting in a building that 80 years ago was a railroad switching yard, think about the benefits of the land grants.

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