

Economic Policy Vignette

A Sanguine Assessment of North American Freight Railroads

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In a world overflowing with information, it's sometimes hard to see past the headlines. And when it comes to freight railroads, recent headlines combine to tell an unsettling story. Coal seems to be fading; other traffic is fragile; positive train control (PTC) costs too much and helps too little; revenues are sagging; regulators are restless; and railroad management is portrayed as hamstrung, handcuffed, hogtied, or otherwise ineffective as it faces an endless array of troubles. Sometimes it's too much – too much to track, too much to absorb, and maybe, too much to fully believe.

Nonetheless, when the din subsides, there's likely to be solid evidence that North America's Class I railroads are *already making ongoing* adjustments to significant economic change. To the extent necessary, the industry will again try to reinvent itself. Meanwhile, to paraphrase the late Yogi Berra, "It's impossible to get a conversation going, everybody's talking too much." Maybe, when things quiet some, the rail industry's future will seem more settled. Right now, however, the headlines leave a lot to consider.

What about Coal?

Given coal's long-standing importance as a source of traffic and revenues, declines in domestic coal production and a resulting reduction in railroad coal traffic are at the center of concerns about the rail industry's future. As recently as 2014, coal accounted for 39 percent of railroad tonnage and 19 percent of revenues. These numbers, alone, point to coal's importance. Are further reductions in coal inevitable and are they traffic manageable?

For rail industry observers, what has happened since 2010 is scary. Most domestically produced coal is used to generate electricity and, if projections hold, coal's share of U.S. electricity generation will have fallen from roughly 45 percent in 2010 to 30 percent by the end of 2016. Railroad car loadings have followed, also falling by nearly one-third.¹

The roots of the movement away from coal lie in a broad set of federal environmental policies that discourage coal's use as a fuel for generating electricity. However, these policies are feasible only because of increased natural gas production that has allowed gas to grow as a generating fuel without increasing its price or the price of electricity.² Fuel and energy markets

¹ For coal data, see U.S. Energy Information Administration, Electric Power Monthly, June 2016, Table 1.1, www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_1_1 Rail data are available through the Association of American Railroads, *Analysis of Class I Railroads* (various years).

² Between June 2010 and June 2016, annual gross production increased by 23 percent, while *nominal* prices for natural gas used in electricity generation fell by 48 percent. See U.S. Energy Information Administration, <http://www.eia.gov/naturalgas/data.cfm>

are notoriously fickle and, of late, coal volumes show signs of a modest recovery.³ Some of the slide in coal activity has been cyclical. Still, there is no reason to expect the movement away from coal to fade anytime soon. As we produce more gas and as coal-fired facilities can affordably be retired, the shift from coal to natural gas will continue with a predictable effect on railroad traffic.

These are the unhappy facts that populate the headlines. A large chunk of valuable railroad traffic is dwindling; it is unlikely to return; and railroads have begun to react. However, a closer look suggests that, though unwelcome, the reduction of coal as a rail industry traffic staple is survivable.

First, consider the magnitude of the shock. For as long as anyone remembers, coal has accounted for roughly 20 percent of Class I railroad revenue. If all coal shipments were to cease *right now* – something that is impossible – the revenue loss to the Class I railroads would almost exactly equal the 20.6 percent recession-induced drop in revenues observed between 2008 and 2009.⁴ Granted, the revenue effects of the 2007 recession were temporary and everyone else was in the same boat. But the fact remains that nothing can happen with coal that will be nearly as immediate or as bad as what the industry has already proved it can endure.

Further, the recession-related traffic declines that pummeled revenues in 2009 occurred across the whole of the railroad network. At least in the case of declining coal volumes, traffic losses are and will be constrained to limited and predictable regional network segments. So long as coal traffic doesn't fade faster than existing coal-dependent infrastructure can be exhausted, the investments that funded coal-only infrastructure can be paid off and not stranded. That's a silver lining of a sort.

Non-Coal Traffic

If coal is really fading, then what's next? Envisioning a North American railroad landscape without coal raises many questions. Some of these include – (1) why has non-coal traffic also gone soft; (2) without coal's contributions toward "common costs" can non-coal traffic be moved profitably; and (3) is there another meaningful source of non-coal traffic that might partially fill the void created by declining coal volumes?

³ For a current analysis of domestic coal production see, the *Casper Star Tribune*, "Coal enters a post-bankruptcy market. What happens then?" September 18, 2016, http://trib.com/business/energy/coal-enters-a-post-bankruptcy-market-what-happens-then/article_a466d872-124b-528b-895a-bdd62ed278c0.html

⁴ Association of American Railroads, *Analysis of Class I Railroads* (various years).

Coal traffic fell during the 2007-2009 recession, but non-coal freight fell more. Not surprisingly then, the relative share of non-coal to coal traffic increased from 2010 forward as the nation waddled toward economic recovery. Indeed, non-coal traffic continued to show steady growth through much of 2015. As importantly, the post-recession rebound in non-coal freight revenues was breathtaking, with an average increase of 11.7 percent annually between 2010 and 2014.⁵ Some of that revenue was needed to absorb temporarily higher fuel costs. Still, much of it was not. However, just when coal traffic volumes entered freefall, non-coal traffic also began to slump.

While there are complex stories surrounding some commodities, the declines in non-coal traffic evident over the past year largely represent an unfortunate example of Murphy's Law. In this case, Murphy arrived aboard a sluggish global economy and a relatively strong dollar. Together these forces have dampened U.S. exports and the associated demand for domestic transportation.⁶ These global issues are probably transient. But, as Murphy's Law would dictate, the timing could not have been much worse for North American railroads.

In the long-run, the second question – the one linking coal traffic to the cost of moving non-coal freight – is more troublesome. Where coal traffic and non-coal freight share line-haul routes and other facilities, large coal volumes have helped reduce the unit costs for moving non-coal shipments. Coal has allowed fixed and common costs to be averaged over much larger total freight volumes. Moreover, there is at least the perception that, when one shipper or another must contribute *extra* revenue to ensure that fixed and common costs are fully covered, this additional burden has largely fallen on coal shippers. *That* safety net is in tatters.

It's easy to imagine that the loss of coal traffic could increase the average costs of serving non-coal railroad customers. While this won't necessarily place upward pressure on non-coal rail rates, there is still a big problem that can quickly get out of hand.⁷ If lost coal makes it impossible to profitably move non-coal freight then the non-coal business may also disappear. This nightmarish possibility places strong pressures on railroad managers to consolidate surviving non-coal freight and preserve traffic densities on key routes, while they also cut other costs as much as possible.

Finally, is there altogether new traffic that might replace coal? Looking at yesterday's and today's world, a replacement is hard to find. There just aren't that many big sources of potential freight. If any existing traffic could be had at rates that are profitable, wouldn't

⁵ Association of American Railroads, *Analysis of Class I Railroads* (various years).

⁶ See, "U.S. Exports Take the Strain of a Strong Dollar," *Financial Times (FT)*, January 6, 2016, <http://www.ft.com/fastft/2016/01/06/us-exports-take-the-strain-of-a-strong-dollar/>

⁷ Pricing of non-coal traffic depends on marginal, not an average costs and it is far less certain that declining coal traffic will affect the *marginal* cost of non-coal movements.

railroads already be chasing it? After all, the industry's 40-year pursuit of intermodal freight underscores its willingness to shoehorn new opportunities into its existing business models even when doing so is, at first, two-sizes uncomfortable.

Three years ago, some pointed to crude-by-rail (CBR) as a potential remedy for lost coal traffic, but the arithmetic doesn't work.⁸ Crude volumes are (and will be) tiny compared to the quantity of coal that no longer will move by rail. Moreover, CBR is politically, physically, and commercially volatile. Its high margins make CBR worth pursuing, but it's no replacement for coal.

In the wake of coal, others point to the capture or recapture of higher valued freight movements – automobiles, boxcar traffic, and consumer goods moving in domestic and international containers. These markets are critical to the Class I railroads, but they are also largely mature. It's hard to see how they could be made substantially bigger.

A better answer *may* lie in the same economic forces that allow less reliance on coal. In addition to its value as a fuel, natural gas is (or can be) a feedstock for nearly one-third of all chemical and plastics products.⁹ It's not surprising, then, that according to the *American Chemistry Council*, U.S. producers are investing close to \$165 billion in new, gas-reliant manufacturing capacity aimed largely at export markets.¹⁰ Moreover, while natural gas inputs will likely be piped to these new facilities, outbound freight will need a path to the sea.

Anyone familiar with freight railroading is aware that the Class I carriers and the chemical sector continually bicker over potential rewards and point fingers over who should bear the liability for hazardous material movements. Still, neither is so stubborn that it will walk away from what may be a richly laid table. And, in fact, there is evidence of quiet talk aimed at resolving existing conflicts so that both railroads and chemical manufacturers can share any potential new bounty. Perhaps, the farmer and the cowboy *can* be friends if it profits both to do so.

One final caution is important. Even if North American railroads find new traffic that helps them to maintain densities in key corridors, that traffic is exceedingly unlikely to have the same

⁸ For a sense of the excitement that initially accompanied the temporary boom in crude-by-rail shipments see, *Progressive Railroading*, "BNSF banks on crude oil, domestic intermodal to build rail traffic and raise revenue," January 2014, http://www.progressiverailroading.com/bnsf_railway/article/BNSF-banks-on-crude-oil-domestic-intermodal-to-build-rail-traffic-and-raise-revenue--39008

⁹ For a non-technical discussion of natural gas as an industrial feed stock, see the Natural Gas Supply Association, <http://naturalgas.org/overview/uses/>

¹⁰ American Chemistry Council, "U.S. Chemical Industry Investment Linked to Shale Gas Tops \$164 Billion, April 6, 2016, <https://www.americanchemistry.com/Media/PressReleasesTranscripts/ACC-news-releases/US-Chemical-Industry-Investment-Linked-to-Shale-Gas-Tops-164-Billion.html>

geographic characteristics as coal. It follows that a lot of coal-only infrastructure will be superfluous no matter what.

PTC, Investment, and Disinvestment

To date, the Class I railroads have spent between \$5 and \$7 billion developing, deploying, and testing *Positive Train Control* (PTC), a set of unfunded Congressionally mandated advanced communication and signaling systems designed to keep trains from colliding with each other or with standing equipment. When complete, the total cost to the railroads will likely exceed \$15 billion.¹¹

Not surprisingly the legislative mandate to develop and install PTC, its current form, the methods of federal oversight, and the timetable for PTC's implementation have, individually and collectively, been controversial both inside and outside the railroad industry. However, amid this controversy, three points attract little argument.

First, PTC, in its present form, doesn't offer the productivity gains that would induce railroads to make the same investment voluntarily.¹² Second, by concentrating traffic on some routes and setting aside or downgrading others, railroads can reduce PTC expenditures below what they would otherwise be.¹³ Finally, particularly given the unanticipated drop in coal-related revenues, mandatory PTC expenditures are probably crowding out potentially profitable investment opportunities.¹⁴

¹¹ Currently, the Association of American Railroads estimates freight railroad PTC costs of "well over \$10 billion." The Joint Council on Transit Wireless estimates freight railroad costs at \$13 billion and passenger railroad costs of \$2 billion. See, <https://www.aar.org/BackgroundPapers/Positive%20Train%20Control.pdf> and http://transitwireless.org/wp-content/uploads/2012/05/PTC_whitepaper_may2012_ver2.pdf

¹² PTC, has been a research goal of Class I railroads for, at least, three decades. In the mid-1980's, Burlington Northern developed and tested the *Advanced Railroad Electronics System* (ARES), an early version of PTC, but never moved toward system-wide implementation. See "When a Railroad Almost Built a PTC System," *Trains Magazine*, September 2014, <http://trn.trains.com/news/railroads/2014/09/when-a-railroad-almost-built-a-ptc-system>

¹³ The Federal Railroad Administration (FRA) published the final rule addressing PTC requirements on January 15, 2010, which consisted of Title 49 of the Code of Federal Regulations (49 CFR) part 236; subpart I. FRA published final rule amendments on September 27, 2010 and on May 14, 2012. Lines requiring PTC are essentially Class I railroad main lines—over which 5 million or more gross tons are transported annually—that handle any poisonous-inhalation-hazardous (PIH) materials and any railroad main lines over which regularly scheduled intercity passenger or commuter rail services are provided. See, <https://www.fra.dot.gov/Page/P0152>

¹⁴ At very least, this was the prediction proffered by CSX CEO, Michael Ward, and Matthew Rose, BNSF's Executive Chairman. See, <http://www.railwayage.com/index.php/freight/class-i/how-csx-will-invest-dol17-billion.html> and <http://www.railresource.com/content/?p=701>

The history of railroading is replete with cases where good, safety-enhancing technologies were not embraced by the industry until those technologies improved productivity and made good business sense. This was true of air brakes and automatic couplers 100 years ago and it will be true of PTC. Also, PTC and the reduction in coal traffic reinforce the same strategy. Both point to a need for consolidating traffic into fewer network route miles. The reduction of coal traffic simply marks the places on the map where this strategy will work best.

At first glance, the compound forces pointing to traffic consolidation may (and maybe should) raise fears regarding wholesale line abandonments and the loss of freight rail service for scores of small and medium-sized communities. On this count, however, senior rail management, so far, is showing a prescience that is seldom associated with railroaders or railroading.

At least a year into an accelerated transition away from coal, the Class I railroads are responding, but so far, they are only doing things that can be undone. Facilities have been closed, routes have been downgraded, some trackage has been leased to short-lines, locomotives have been stored, and employees furloughed, but nothing has been abandoned, nothing has been liquidated, and nothing has been scrapped. To date, what's been done could be undone with phone calls, e-mails, or at most, a couple of hours with a backhoe.

In economic terms, it appears that railroad managers are aware that forestalling irreversible disinvestments creates options that have *real value* during periods of uncertainty. This is genuinely encouraging. To be sure, options eventually expire and irreversible actions are inevitable, but in the meantime, everyone has a chance to gather and evaluate information that is currently unavailable.

Regulation and Regulators

In the late 1970s and 1980s, the federal government replaced its monolithic and micro-managed method of economic rail industry oversight with a regulatory regime that is more flexible and balanced. This does not, however, mean that regulation has gone away. In 1996, the Interstate Commerce Commission (ICC) was eliminated and its surviving railroad responsibilities were transferred to the Surface Transportation Board (STB). Meanwhile, responsibility for safety and environmental compliance has remained with the Federal Railroad Administration (FRA).¹⁵ Both the STB and the FRA remain very visible in the railroad landscape.

¹⁵ The regulatory course of railroad oversight, including the passage of the 1980 Staggers Rail Act and the Interstate Commerce Termination Act, has been widely chronicled. For example See, Mark Burton, "Sustaining Balanced Policy: The Role of Economics in Post-Staggers Rail Rate Oversight," *Journal of Transportation Law, Logistics & Policy*, 2014, Vol. 82, No. 4, pp. 263-297.

Last year, the STB was reauthorized by Congress and both its membership and powers were expanded.¹⁶ The same legislation also removed the Board from U.S. Department of Transportation oversight, so that now both its actions and ability to secure Congressional funding are independent of the USDOT.¹⁷

Perhaps, mindful of a brighter spotlight, the STB has, since, unleashed a raft of new (or revived) regulatory proceedings that, depending on outcomes, could measurably amplify the Board's oversight of and involvement in day-to-day railroad decision-making. Meanwhile, the FRA has sought to usurp train crew-size decisions that have traditionally been the purview of rail management and labor.

No single STB or FRA initiative is, on its own, particularly remarkable, but the sum of these actions sends a clear signal of increased regulatory involvement. That these sibling agencies have chosen now to compete for attention from Congress is ironic. The combination of emerging technologies and market forces would seem to have reduced the need for rail oversight to what may be an all-time low.

Consider that between 1996 and 2014 nearly all (96 percent) of STB railroad rate cases were filed by either coal or chemical shippers (63 and 33 percent, respectively).¹⁸ In the current, gas-rich environment created by hydraulic fracturing, the railroads' ability to squeeze coal shippers for additional revenues is diminished and probably fleeting. Similarly, as suggested above, cheap and plentiful natural gas may soon mean that chemical manufacturers and railroads will need each other more than ever.

Finally, as if blind to emerging technology, its own findings about potential PTC's benefits, and the probable future of all freight transportation, the FRA is promoting a requirement of two-person onboard train crews at a time when the rest of the world may soon sanction freight-laden trucks that have no onboard crew members *at all*.

¹⁶ See, S.808 - Surface Transportation Board Reauthorization Act of 2015, 114th Congress (2015-2016)

¹⁷ Without question, the most salient popular analyses of the STB and related regulatory issues are provided by Frank Wilner, a contributing editor at *Railway Age*. For a recent example see, "STB dysfunction menaces revenue adequacy," <http://www.railwayage.com/index.php/blogs/frank-n-wilner/stb-dysfunction-menaces-revenue-adequacy.html>

¹⁸ For a summary of results of freight rail rate challenges at the Surface Transportation Board, see, https://www.stb.gov/stb/industry/Rate_Cases.htm

What Now, What Next?

There's a good chance that most senior railroad executives underestimated the speed with which coal volumes would decline. It's even more likely that the industry as a whole did not guess that evaporating coal volumes would be accompanied by soft markets for non-coal freight. Things are probably tougher on the railroads today than most managers expected. Still, looking back at the past five years, there are signs that senior railroad leadership saw more than they were saying and that they were preparing more than we knew for the fundamental economic changes that only now are making headlines.

Even in the thick of a deep recession, The Class I railroads continued to invest, at times, almost frenetically. They invested in corridor capacity, invoking or inventing names like *Transcon*, *Crescent*, *National Gateway*, and *Sunset*, building core capacity that will be useful with or without coal. And when these investments did not exhaust available cash, the railroads began buying back equity shares as a reliable and profitable store of future investment capacity and a hedge against coming troubles.¹⁹ The result is a North American railroad industry that is in excellent physical and fiscal condition.

Now, however the elephant in the room is wide awake. Within the past year, coal production, at least in some regions, has cratered; many major coal producers have entered bankruptcy; and the volume of coal moving by rail plunged.²⁰

The railroads wasted little time before responding. Coal-only secondary trackage is being downgraded, taken out of service, or leased to short-lines, while remaining coal volumes are diverted to more circuitous routes to preserve traffic densities elsewhere. In and near the coal producing regions – particularly in Appalachia – this has meant job cuts, furloughs for train crews, maintenance of way workers, and mechanical personnel, as well as the relocation of administrative activities.²¹ While the worst may be past for some communities, for others it is still to come. As coal volumes fall further, the railroads will continue to make necessary adjustments. Reinvention, like birth itself, can produce a lot of pain.

¹⁹ For example see, "CSX Continues to Run on the Share Buyback Tracks, *Yahoo Finance*, April 20, 2016, <http://finance.yahoo.com/news/csx-continues-run-share-buyback-220653647.html>, "Soaring Stock Doesn't Slow Union Pacific Buybacks, *Wall Street Journal*, April 9, 2013, <http://blogs.wsj.com/cfo/2013/05/09/soaring-stock-doesnt-slow-union-pacific-buybacks/> or "Assessing Kansas City Southern's Stock Buyback Practices," January 29, 2016, *Market Realist*, <http://marketrealist.com/2016/01/kansas-city-southern-stock-buyback-progress/>

²⁰ Bankruptcies include but are not limited to Peabody Energy, Arch Coal, Alpha Natural Resources, Patriot Coal, and Walter Energy.

²¹ For example, CSX has removed portions of trackage in eastern Kentucky from service, closed shops in Erwin, Tennessee, and relocated administrative activities from Huntington, West Virginia. At nearly the same time, Norfolk Southern ceded control of its West Virginia secondary mainline trackage to a short-line carrier, closed coal docks in Ashtabula, Ohio, and relocated administrative functions from Bluefield, West Virginia.

Ten years from now, Class I railroads will not look like they do today. Their mileage will shrink. PTC makes route miles more expensive to maintain. Lost coal volumes will make many of these same miles harder to pay for. Traffic consolidations on the big railroads will continue. However, unlike the 1980s, today's financially healthy Class I's can take their time, gather information, and make careful decisions about what to retain and what to discard. Still, even as overall traffic volumes are rebuilt, a lot of coal-related trackage will disappear from system maps. Short-lines will undoubtedly absorb some routes the Class I railroads no longer need and short-lines can sometimes be a wonderful alternative to abandonment. Nonetheless, small railroads still need *some* traffic and, deep in the coal fields, even meager traffic opportunities may prove elusive.

Elsewhere, across the rail network, the future is brighter. As noted, the network features robust, well-kept heavy-haul corridors where more and more freight will be routed. These network backbones are in no danger. Lesser main-line trackage that, until recently, has been shared by coal and non-coal freight is more vulnerable, but can probably be sustained so long as maintenance costs are closely watched and alternative, density-restoring traffic is developed. The Class I's may downgrade route segments or relinquish control of some main line trackage temporarily. However, it looks like most railroads will preserve the option to restore both control and capacity as long as possible. Some good, single-track railroad may not survive this test, but much will.

Finally, many, most, maybe all of the better possible outcomes described here depend on stable, even-handed federal policies that minimize regulatory intrusion. This part should be easy. Less than two generations ago, today's economic environment would have crushed what remained of our fathers' railroads. The fact that the railroad industry is, instead, (reluctantly) ready to meet current challenges reflects the strength of the market-based policies instituted in the 1970s and 1980s. Anyone who doubts the immutable power of markets hasn't witnessed the speed with which utilities have embraced cheap and abundant natural gas or the glee with which utility managers now negotiate contracts for the railroad movement of coal.²²

All that is necessary now is to preserve the present day mechanics of what the U.S. Senate, in 1995, referred to as, ". . . the most successful rail transportation legislation ever produced. . ." ²³ This part should be easy, well it *should* be.

²² It its 1985 decision describing the post-Staggers regulatory regime that is still in place today, the Interstate Commerce Commission wrote, "The demand for coal transportation is not totally inelastic. In the intermediate to-long term, the market can and will respond to the cost of transportation by offering both the sources and volume of coal shipped. See, ICC EP 347 (Sub No. 1), August 8, 1985, p. 19.

²³ See U.S. Senate, Committee on Commerce, Science and Transportation, 104TH Congress, Report on S. 1396 3 (November 21, 1995).