Regulatory changes and employment, focusing on the “toxics rule”

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I thank the House Committee on Oversight and Government Reform, especially Chairman Issa and Ranking Member Cummings, for the invitation to testify today on the topic of the Environmental Protection Agency's (EPA) proposed rules governing the emission of mercury, arsenic and other toxic air pollution from power plants, which I'll refer to henceforth as the "toxics rule".

I am Josh Bivens, an economist at the Economic Policy Institute in Washington, DC. For the kind of professional, peer-reviewed cost/benefit analysis that *should be* the clear criterion upon which judgments about the toxics rule – and all other proposed regulatory changes – are made, I'm at best just one in a long list of economists that could be testifying in front of your committee. Further, it's not just modesty that compels me to say that for this sort of cost/benefit analysis, there are plenty of economists and other experts that could be even better choices.

However, the debate over the toxics rule has often become a debate about jobs – and this is partly understandable, given that far too many Americans remain jobless nearly four years after the bursting housing bubble led to what is now known as the Great Recession – the steepest and longest economic contraction we've seen since the Great Depression.

This entangling of the debate regarding the toxics rule with the current crisis of joblessness is why I began writing about this rule – because on the topic of job-creation and economic performance, I actually am an expert. I know what does and what does not materially affect unemployment and employment growth in the U.S. economy; and regulatory change is something that generally does *not* affect these. Put simply, what drives changes in the unemployment rate is just the macroeconomic performance of the economy. So unless one can tie a given regulatory change to a major shift in macroeconomic performance, it will be very hard indeed to say that the change has any major effect on unemployment.

In my testimony, which draws heavily on a Briefing Paper that I authored for EPI, I will sketch out how regulatory change in general, and the air toxics rule specifically, can impact unemployment. I conclude that the air toxics rule – like almost all related regulatory changes – can have only trivial effects on job-growth over the longer-run, and that in the shorter- run (over the next couple of years – particularly if the unemployment rate remains high) its effects on unemployment will be clearly ameliorative (if modest). In fact, it is *precisely because* the economy has so much unused capacity today that the impact of the air toxics rule, if implemented as planned, would have positive impacts on job-creation and would lead to a lower unemployment rate. In short, calls to delay implementation of the rule based on vague appeals to wider economic weakness have the case entirely backward – there is no better time than now, from a job-creation perspective, to move forward with these rules.

The major findings of my research on the employment effects of the toxics rule are as follows:

- The rule will have a modest positive net impact on overall employment, likely leading to the creation of 28,000 to 158,000 jobs between now and 2015.

- This net job impact is the result of "cross-cutting" effects. In other words, higher energy prices are likely to lead to small increases in industry costs, which will lead to small reductions in final demand for their output and hence small reductions in labor demand.

These depressing effects, however, are swamped by the job growth spurred by new investments in pollution abatement and control (PAC) and induced spending as well as small increases within the utility sector itself. Furthermore, this net gain is amplified through re-spending effects as those who gain jobs increase their consumption thereby generating jobs throughout the economy. More specifically:

-Between 17,000 jobs would be lost and 35,000 jobs would be gained in the utility industry itself.
-Between 81,000 and 101,000 PAC jobs would be created.
-Between 31,000 and 46,000 jobs would be lost due to higher energy prices leading to reductions in output.
-Assuming a re-spending multiplier of .5, and since the net impact of the above impacts is positive, another 9,000 to 53,000 jobs would be created through respending.

Again, the clearest take-away point from the EPA's regulatory impact analysis (RIA) and other analyses of pollution standards is that the *primary* economic impact these rules will have is on health and quality-of-life outcomes. The improvements to health and quality-of-life stemming from the proposed rule changes would be very large and make the regulatory change worthy of support in and of itself. Specifically, the EPA estimates (based on the state-of-the-art research) that adoption of the proposed rule would:

-lead to 6,800 to 17,000 lives saved (which the EPA describes as "avoiding premature mortality");
-lead to 11,000 fewer heart attacks;
-lead to 12,200 fewer hospital and emergency room visits;
-lead to 225,000 fewer cases of respiratory symptoms; and
-lead to 850,000 more work days (because workers are healthier).

The 'monetized' value of these and certain other health benefits would amount to $55-146 billion per year, dramatically exceeding the $11.3 billion annual cost of the program (figures in 2010 dollars).[1]

Again, it is these substantial benefits to health and quality of life that should be the main criterion for judging the worth of passing the toxics rule. But, since we're here today to talk about jobs – I will pivot for the rest of the report to this.

Overview of how economists think about regulatory changes and employment

Given that regulations are often reflexively opposed on the grounds that they inevitably lead to job loss (generally, very large job-losses are implied), and given as well that huge damage inflicted by the Great Recession remains very much with us even two-plus years after its end, insecurity over jobs remains front-and-center in American political debates. Hence, it is useful to take a rigorous and comprehensive look at how these regulatory changes are likely to affect job-creation and unemployment. Again, it should be noted that this briefing paper assesses the job impacts of the economic projections provided by the EPA in their rigorous RIA. If their estimates

[1] In the EPA RIA these numbers are expressed in 2007 dollars – the monetized benefits in those units are between $53 and $140 billion while the costs are $10.9 billion.

of key economic parameters (the number of coal plant retirements, the price impacts of regulation, or the amount of capital spending induced by the rule) are changed, the job impacts in this analysis would change as well. That said, past research (see Shapiro and Irons (2011), for example) shows that EPA estimates of the costs of regulations tend to, if anything, generally be too pessimistic about how difficult they will be for businesses to comply with.

It should also be noted at the outset that the job impacts of regulatory changes are very different depending both on the time-horizon examined as well as the macroeconomic context. Below, the differing employment effects that occur over these different time-horizons and macroeconomic contexts are sketched out.

Employment over the long-run in well-functioning economies
In the long-run and during times when the economy is functioning well, the job impacts from these regulations would likely to be quite small, for two main reasons.

In the long-run, industries have time to adjust inputs to reflect changing relative prices (say, substituting more capital and labor for energy inputs as regulatory changes make energy more expensive), and job *losses* in energy-intensive industries that see demand for their output fall due to rising energy prices will be substantially counter-balanced by job *gains* in industries that are not energy-intensive and that benefit from the changed consumption patterns induced by the regulatory change.

Furthermore, in a well-functioning economy any depressing effect on aggregate demand stemming from regulatory changes (declines in consumers' purchasing power driven by increased energy prices, for example) can be offset with other macroeconomic policy levers—reducing interest rates to spur business investment, for example.

Hence, in the long-run in a well-functioning economy, it is accurate to say that there are *no aggregate job losses at all* stemming from regulatory actions like the toxics rule. Instead, because regulations may slightly raise the price of energy and this cuts the purchasing power of workers' wages, there may be very small voluntary reductions in hours supplied to the labor market by American workers. By all accounts, however, the price increase spurred by the toxics rule as well as the labor-supply response stemming from them will be vanishingly small.

The fact that there are no *aggregate* job-losses does not mean, of course, that each and every industry escapes job losses. Some industries will see job losses (energy-producing and heavily energy-using industries) and some will see job gains (light energy-using industries and some that provide alternative sources of energy-generation that do not emit the regulated toxics). The degree to which job-losing industries should be aided with complementary policies is an important question, but it should remain clear that in the long-run regulatory action like the toxics rule does not lead to overall involuntary job loss.

Employment effects in the short-run in economies with excess capacity
The analysis is very different in the short-run, especially a short-run characterized by chronic excess capacity and historically high rates of unemployment. Under these conditions, the job impacts of regulatory changes can be substantial.

On the negative side, any depressing effect these regulatory changes have on aggregate demand are harder to counter-balance with traditional macroeconomic policy levers (for example, the "policy" interest rates controlled by the Federal Reserve are sitting essentially at zero today, so lowering these is not a viable option – though fiscal stimulus could still be used to counter-balance any declines in demand stemming from regulatory changes), and job losses in energy-intensive industries are not likely to be recouped quickly through job gains in less energy-intensive sectors. In fact, these job losses may well just be amplified through multiplier effects.

On the positive side, capital investments made in order to bring power plants into compliance with new rules also spur multiplier effects, and may well represent net new spending in an economy where both businesses and households are extremely reluctant to make new purchases.

Given the actual context in the U.S. economy today as these rules are being debated, this briefing paper mostly focuses on the short-run impacts of regulatory change occurring in an economy with chronic excess capacity. Furthermore, economists and policymakers should be mindful of a key lesson of both the Great Recession but also the Japanese lost decade of the 1990s: while in theory it is easy to imagine ways to keep aggregate demand shortfalls from being problematic for economies, in practice this demand-management might be considerably harder. Given these historical episodes and given academic research on the positive externality benefits of spurs to aggregate demand, economists and policy makers should not be too quick in assuming a long-run horizon where problems of excess capacity have been solved.

The role of complementary policies

Another issue that is made even more salient by today's context of high rates of joblessness and economic under-performance is the role of complementary policies to aid the adjustments that will be needed should the proposed rule become law.

Some industries will see job losses (even as overall job changes are positive), and workers will need to find alternative employment in a very tough labor market. Complementary policies should cushion the amount of industry loss and help those workers who must change jobs. Most importantly, complementary policies that help to achieve both the explicit goals of the regulation (reduced emissions from power plants) as well as minimizing the labor-market adjustments needed should be front and center in the policy debate.

The specific impact of the air toxics rule

In this section, we quickly sketch out the different channels that are relevant to the debate over the effect of the proposed toxics-rule regulation and jobs given the context of a U.S. economy still facing clear shortfalls in aggregate demand. We would note that an analysis that attempts to capture the incremental employment effects stemming from the proposed rule through all of these channels has not yet, to our knowledge, been undertaken. As mentioned before (and documented below), the EPA technical analysis released with the proposed rule quantified the employment implications of some channels of the rule, but was far from exhaustive. And other studies (see Heintz el al. (2010), for example) have looked at the likely activities of the utility sector in light of a set of assumptions regarding the combined effects of the final toxics rule as well as other regulations, but have not isolated the incremental job-effects of the toxics rule alone, apart from other regulatory changes and (importantly) apart from the presumed baseline path of employment and investment in the utility sector. This paper aims to quantify solely the incremental employment changes to be expected from adoption of the proposed toxics rule.

The channels that link the proposed rule-change to employment changes are as follows:

Impact on directly-regulated utilities themselves

The most obvious effect of regulations is on the industries that are directly regulated. In the case of the toxics-rule, this means utilities. The toxics rule RIA provides a very good assessment of the likely employment effects of the rule on the utilities themselves, following the approach of Morgenstern, Pizer, and Shih (MPS, 2002), which provided an empirically rigorous examination of the employment effects of regulation on four industries (none of them utilities). MPS identify three separate channels through which regulatory change can impact an industry that is being directly regulated:

-***The output effect***. This is simply the reduction in demand for industries' output that can occur if regulatory changes raise the price of this output.

-***The cost effect***. The cost-effect reflects the fact that if production costs rise due to regulatory change, more inputs (including labor) are needed to produce the same amount of output.

-***The factor-shift effect***. The factor-shift effect reflects the fact that environmental activities *within* a given sector may be more labor intensive than conventional production.

The toxics rule RIA essentially uses the overall averages from the MPS (2002) study to estimate the likely impact on employment in the utilities sector. While none of the four industries studied by MPS (2002) are utilities, there is still a strong case to be made that the study's results can provide a useful benchmark and, if anything, actually paint a too-pessimistic picture in regards to the likely impact of regulations on job trends in the utility sector.

This is because the average output effect measured for the industries studied by MPS (2002) is likely to be far larger (in the negative direction) than that faced by the utility sector, for two reasons.

First, the price elasticity of demand for utility sector output is much lower (by a factor of four) than that facing three of the four industries examined in MPS (2002). This means that a change in the prices of the output of the utility industry has much less effect on demand for its output (and consequently on employment) than do changes in prices of the products of the other industries.

Second, the utility sector is much less exposed to international competition than the four industries examined by MPS (2002). The relevant elasticities and import shares are displayed in the table below, drawn from my briefing paper.

TABLE 1

Price elasticities of demand and import shares, utilities vs. Morgenstern et al. industries

	Utilities	Pulp and paper	Plastics	Steel	Petroleum
Elasticity	-0.16	-0.698	-0.987	-0.953	-0.071
Import share of domestic consumption	0.5%	33.2%	15.3%	22.1%	10.0%

SOURCE: Morgenstern, Pizer, and Shih (2002) and Ho, Morgenstern, and Shih (2008).

Given that the output effect is by far the largest negative contributor to employment growth in the directly regulated industries studied by MPS (2002), and given that this effect is sure to be much smaller for the utility sector than for the average of the industries they studied, it seems clear that the MPS (2002) results are likely to be quite pessimistic in regards to the jobs impact of the proposed toxics rule.

Impact on the environmental protection (EP) sector

Meeting the new standards will, according to the EPA RIA, lead to substantial investments in pollution abatement and control (PAC) – and these investments will spur output in what Bezdek, Wendling, and DiPerna (2008) call the "environmental protection" (EP) sector of the economy. For example, utilities are forecast to purchase and install scrubbers and filters and other equipment meant to capture pollutants before they are released into the atmosphere. These PAC investments will lead to job-growth – scrubbers must be manufactured and installed.

It is important to note as well that a given amount of final demand in the EP sector does not just create jobs *within* that sector; it also creates jobs in industries that *supply* this sector. For example, if steel is a key intermediate good used in the production of scrubbers, then increased demand for scrubbers will lead to employment gains in the steel sector as well.

The toxics rule RIA assumes that utilities will respond to the new standards in part by undertaking significant investments in PAC construction and installation. While investments made by firms as a result of tougher environmental standards are often thrown under the rubric of "compliance costs," it is important to realize that these are *not* simply foregone economic activity, but instead are largely a *re-orientation* of activity.[2] In short, spending on goods and services that are needed to reduce pollution is an activity every bit as capable of creating jobs as spending on anything else.

The RIA forecasts that $8 billion will be spent in the construction and installation of PAC equipment between now and 2015 as a result of the proposed rules. The RIA further estimates that this $8 billion results in roughly 31,000 job-years supported directly in the EP sector. A technical supporting document (TSD) to the RIA breaks out these jobs and allocates them to

2 While there are portions of the social costs identified in the RIA that are indeed purely foregone economic activity, costs dedicated to purchase of PAC equipment are not part of them.

installation of pollution control equipment and jobs spurred by the need to hire operators and materials used in the PAC processes. **Table 3** replicates their job break-outs below.

TABLE 3

Employment effects using the environmental sector approach

Jobs associated with PAC construction and installation	Number of jobs
Construction jobs	30,440
Steel jobs	430
Subtotal	30,870
Jobs associated with new operational needs	**Number of jobs**
Increased resource use[1]	5,230
Increased operational needs[2]	5,500
Subtotal	10,730
Total	41,600

(1) These jobs are supplier jobs.
(2) These jobs are probably already estimated in the "effects on directly regulated industry" methodology following Morgenstern et al. (2002).
SOURCE: EPA (2011a).

On balance, the toxics rule technical supporting document likely undercounts EP jobs
The EPA's analysis of the jobs generated by the toxics rule is likely actually too conservative, leading to an undercount of the employment generated by these EP investments, for two reasons.

First, the implied direct job-multiplier of one job-year created for every $259,000 in spending seems low when compared to other data sources. When data sources like the employment requirements matrix (ERM) of the Bureau of Labor Statistics (BLS) or the Census of Construction are consulted, one gets a much higher direct job-multiplier (between roughly one job per $134,000 to $158,000; see Table 3).

Second, the RIA identifies only the jobs *directly* related to the construction and installation of PAC equipment—mostly missing in this analysis are the jobs supported by final demand for the construction and installation of PAC equipment in *supplier* industries, like those that manufacture the PAC components that are installed. The toxics rule RIA *does* show jobs supported in the steel industry stemming from PAC construction and installation, but these jobs are likely far too small a fraction of the direct jobs to fully reflect the impact of increased PAC construction and installation on supplier industries.

To get a rough sense of how many supplier jobs are being missed in the toxics rule RIA, one can consult the BLS ERM and examine the employment vector in the overall construction industry associated with each $1 million in final demand in that sector. The construction vector in the ERM indicates that each $1 million is associated with roughly 11 jobs in the overall economy, with just fewer than seven of these jobs being accounted for directly in construction. This means that four of the 11 overall jobs (or about 37% of the total) associated with each $1 million in construction spending is actually a supplier job. Of the supplier jobs associated with a given level of spending in the overall construction sector, over a *quarter* come from the manufacturing sector.

In short, the toxics rule RIA, by not accounting fully for supplier jobs supported by spending on installation and construction of PAC equipment, could well be undercounting jobs through this channel by almost 40%, and manufacturing jobs are some of the most significantly undercounted jobs. Counting the steel jobs alone does not nearly give one a good order of magnitude of the supplier jobs supported through the construction and installation of PAC equipment.

A more complete number on PAC investments and jobs
The safest method to use to estimate the number of jobs (including both direct and supplier jobs) that are supported by a given amount of spending on PAC construction and installation is to use the BLS ERM and plug-in the forecasted amount of induced PAC investment as the input. This approach will be the preferred estimate used in this paper for identifying the overall job effects; this approach indicates that 91,000 jobs (56,000 direct and 35,000 indirect) are created through the $8 billion in PAC spending by 2015, at a per job cost of $87,000.

Is counting job gains stemming from compliance costs like the "broken windows" fallacy?
Often in regulatory debates, counting jobs gained through business spending meant to meet new regulatory standards is subject to the accusation that this calculation is an example of the "broken windows" fallacy. This alleged fallacy is the notion that replacing a shopkeeper's window that has been broken by a stray baseball does not generate net new productive employment because the money spent to replace the broken window would have been spent somewhere else (and more productively) had it not been necessary to make the repair – and this foregone spending is destroying jobs as surely as replacing the broken window creates them.

The "broken windows" fallacy is useful to remind policymakers that each use of resources has opportunity costs that must be kept in mind when making cost/benefit analyses, but it surely does not say that the jobs gained through investments made to meet regulatory standards can never constitute net new additions to overall employment. There are essentially two ways that such induced capital compliance costs can spur net new job growth.

The first way—and the way most relevant to today's debate—is if these compliance costs mobilize currently idle financial savings into productive investment flows. This seems extremely likely in today's economy. For one, U.S. corporations sit on massive amounts of liquid cash-holdings that are not being mobilized to finance job-creating investments. For another, the economic channel that is supposed to mobilize these cash holdings into investment is declines in interest rates—yet these rates sit at historic lows today with little prospect that they can be pushed lower through regulatory inaction that will spur non-compliance investments. In the jargon, the U.S. economy is in a liquidity trap that keeps financial savings from being channeled into job-creating investments. Regulatory changes that mobilize this financial savings will indeed create jobs in this economic situation.

Second, even in a well-functioning economy, it is far from clear that the investments undertaken in the name of meeting new regulatory standards cannot add to total employment *even if the financial resources that financed them would have spent elsewhere*. If the construction and installation of PAC equipment, for example, is significantly more labor intensive than the same amount of spending deployed in alternative economic activities, for example, then even just switching from these other activities to PAC investments would yield an increase in labor demand) This scenario actually seems quite likely, especially when one considers the likely alternative uses of the financial resources used to undertake these investments.

Remember, the economic mechanism that channels financial savings into productive investments is interest rate changes. So, if not spending $8 billion on PAC construction and installation boosts financial savings of utilities by this amount, and if the economy is functioning well and seamlessly translates this money into alternative job-creating investments, it will do so by lowering interest rates. This means that the alternative job-creating investments will take place in *interest-sensitive* industries. Interest-sensitive industries are essentially construction or durable goods manufacturing. Since the PAC investments are largely construction, and typically labor-intensive forms of construction at that, it is hard to see why alternative ways of spending this $8 billion would obviously lead to more jobs created through increased non-PAC construction spending. Durable goods manufacturing, additionally, is some of the least labor-intensive production in the entire economy, so spending directed there as an alternative to PAC construction and installation is very unlikely to prove a better job creator.

Given the large amounts of excess capacity and the failure of interest rates to mediate the savings and investments relationships in the U.S. economy today, it seems very likely that the investments mobilized through the need to meet the new proposed standards would represent a nearly pure net new addition to economy-wide employment. And even if these investments happened in an already well-functioning economy, there is still little reason to believe that they would be anything but a plus to job creation.

It should be noted that this macroeconomic reasoning carries through to the utilities sector as well. Even if the utilities sector had concrete plans to spend the $8 billion that will now have to be dedicated to compliance costs on some other investment project, today's historically low interest rates mean that they are free to do both at minimal cost. Furthermore, as most analysts agree that the financial health of the utilities sector is even more connected to interest rates than most (because of their significant infrastructure needs, utilities tend to have high debt load and benefit greatly from low interest rates), it is hard to imagine that the utilities sector is currently more cash-constrained than the overall corporate sector today.

Impact on energy-using industries

If the proposed rules lead to increases in the price of energy, industries that are intensive *users* of energy could see noticeable increases in their own production costs. These price increases could lead to reduced demand for their output, harming employment in these sectors.

The RIA estimated that the new toxics standards would raise prices of electricity by 3.7% and overall energy prices by 0.8%. To estimate the effect on demand for industrial output (and then employment) in energy-using sectors, one only needs an estimate of each industry's energy intensity (the share of energy costs in total production costs) and an estimate of the elasticity of demand for final output. As energy prices rise, one can assume that overall costs in a sector rise in proportion to energy's share of total costs. Then, the increase in total costs can be multiplied by the elasticity of demand for final output to yield the output losses in each industry stemming from rising energy prices.

A study by Ho, Morgenstern and Shih (HMS, 2007) provides the parameters needed to make this calculation. It is a little unclear whether to use the parameter for total energy price increases (0.8%) or electricity only (3.7%) to calculate the output effects of rising prices. If one assumes that it is relatively easy to change energy sources for an energy-intensive industry, even in the very short-run, then overall energy prices should be used. If one does not assume this, then the larger electricity price increases should be used. Doing it both ways, this study finds that the total job loss stemming from lost output in energy-using industries is 31,000 using the overall energy price increase and 46,000 using the electricity-only price increases.

It is important to realize, however, that much of the discussion regarding economic counter-factuals that informed our estimates of jobs gained through PAC construction and installation (i.e., concerns over the "broken windows" fallacy) apply to the jobs displaced by rising energy prices, but in reverse . This means that while demand for industrial output falls as the price of this output rises in response to rising energy prices, in the longer-run and in a better-functioning economy, much of this decline in demand can (and would) be neutralized by using other macroeconomic policy tools: lowering policy interest rates to spur business investment, for example. In short, if one decided that it was utterly inappropriate to look at short-run employment gains that might be counter-balanced by larger macroeconomic policy levers, then it must also be inappropriate to examine short-run employment losses that could also be so counter-balanced.

Impact stemming from re-spending effects of net job creation outcomes from other channels
The net impact of the previous channels will, given the vast amounts of unused capacity in today's U.S. economy, be amplified by "re-spending" effects. As workers are, on net, either hired or displaced through the channels sketched out previously, this will either increase or decrease overall purchasing power in the economy and this initial change in spending will be subject to a re-spending "multiplier" as it ripples through the economy. So, if net job creation stemming from the other channels is positive, then newly-hired workers will buy more food and clothes and other goods and their spending will add to incomes in these other sectors. If the net job-creation from other channels is negative, the reduced spending on food and clothes and other goods will subtract to incomes in these other sectors.

In the short-run in an economy characterized by excess capacity, if the previous channels all sum to a net job-gain stemming from the implementation of the proposed toxics-rule, then these extra jobs should be multiplied by the "re-spending" effects of newly employed workers to get a total jobs impact.

The intuition is simply that construction workers newly hired to install PAC equipment and manufacturing workers newly hired to produce the intermediate inputs for this construction will have extra income, a portion of which they will spend. This additional spending in the economy will support production (and jobs) in sectors of the economy wholly unrelated to the activities associated with conforming to the toxics rule. For example, waitstaff will be hired by diners that are serving more lunches because the newly hired construction workers come through the door, and clerks will be hired by retail clothing stores that will sell more back-to-school clothes to newly hired manufacturing workers.

These re-spending effects are likely to be particularly large in the present economic moment, when the U.S. economy is characterized by a severe shortfall of aggregate demand for goods and services relative to what is needed to ensure low rates of unemployment.

Of course, if the combined job impacts of the previous channels sum to less than zero, then the negative shock to employment would also be amplified by the re-spending effects (waitstaff would be laid-off as diners served fewer lunches because workers in energy-using industries lost their jobs and these effects dominated others).

The estimates of re-spending effects (or, "re-spending multipliers") stemming from job-creation are rather varied. Bivens (2006) uses an estimate of 0.5, noting that the literature provides estimates of the re-spending multiplier that run from 0.25 to 1.7. Given that there's very little objective criterion to judge what is the best value within this range, the re-spending effects are presented spanning the full-range of these estimates, with 0.5 being the preferred estimate. With this estimate, and using the mid-point of estimates of job changes from each of the other channels, re-spending effects will add 31,000 jobs stemming from adoption of the proposed toxics rule.

Again, in the longer-run and in a better-functioning economy, the boost or decline to aggregate demand stemming from these re-spending multipliers can and will be offset with other macroeconomic policy tools. But in today's economy, characterized by lots of excess capacity, these re-spending effects will be powerful indeed.

The table below sums the effects from the previously mentioned channels, being careful to not double-count any effects. It then applies various re-spending multipliers to the results to get a final number on job creation stemming from the proposed toxics rule.

TABLE 5

Employment effects from each channel

Channel	Jobs (high)	Jobs (low)	Jobs (average)
Directly regulated utility effects, MPS approach	35,000	-17,000	9,000
Effects from investments in EP sector, direct + supplier jobs	101,000	81,000	91,000
Effects from output changes in energy-using sectors	-31,000	-45,600	-38,300
Subtotals	105,000	18,400	61,700
Re-spending effects channel			
Re-spending multiplier = 0.25	26,250	4,600	15,425
Re-spending multiplier = 0.5	52,500	9,200	30,850
Re-spending multiplier = 1.7	178,500	31,280	104,890
Totals			
Re-spending multiplier = 0.25	131,250	23,000	77,125
Re-spending multiplier = 0.5	157,500	27,600	92,550
Re-spending multiplier = 1.7	283,500	49,680	166,590

SOURCE: EPA (2011a), author's calculations using data from the BLS ERM and HMS (2008), as described in text.

A note on the fundamental conservatism of these estimates

Of the primary (ie, before re-spending) effects of the toxics rule on employment specified in this report, one is essentially neutral (employment changes within utilities), one is clearly positive (effects of PAC investment) and one is negative (effects of price changes due to higher energy costs).

Given the current situation of the U.S. economy – caught in a “liquidity trap” – it’s actually unclear that the higher product prices caused by more-expensive energy generation would actually have any negative bite at all on the economy.

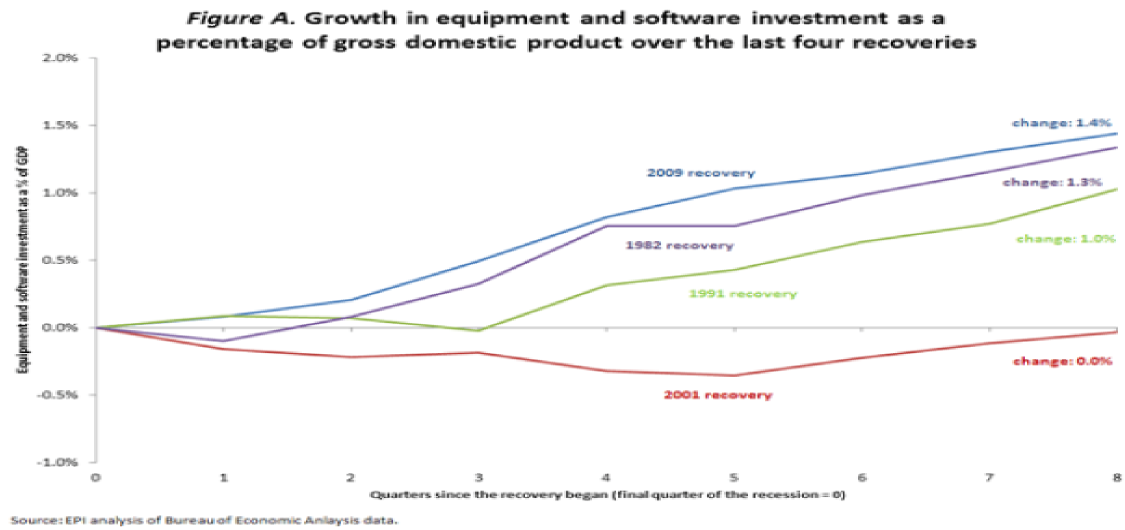
Buitier (2000) has perhaps the clearest exposition of what an increase in a sector’s relative price will do for overall economic growth. His overall assessment is that any relative price change not associated with a permanent change to economy-wide productivity growth will not affect the degree of economic slack – this is an uncontroversial position. Moreover, he argues that if a relative price increase in one sector is generated through a slight increase in the overall price level, the only way this increases economic slack in the short-run is by spurring a response from the Federal Reserve in the form of higher interest rates. But, we know that the Federal Reserve has no plans in the next couple of years to respond excessively to what would be clearly a very small and very transitory rise in the overall price level spurred by the toxics rule (or actually any degree of regulatory change currently on the table).

In short, assuming that higher prices spurred by the need to make investments in plant and equipment in the utility sector will actually dampen employment growth in the next couple of years represents a very adverse scenario wherein the Federal Reserve does something that is both unwise and which they have repeatedly said they would not do. Given that the potential downsides of this action – which are very unlikely – are included in the overall tally of the employment impacts of the toxics rule, this means that I would treat the bottom-line estimate as a very conservative estimate of the job-gains that should be expected from its timely implementation.

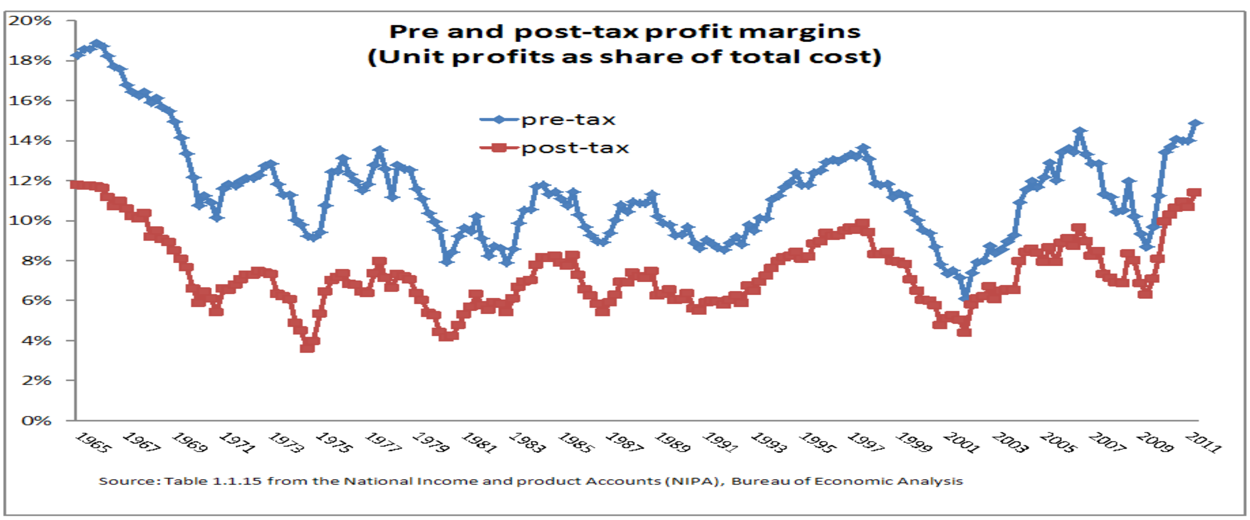
General observations on the generic argument that regulatory changes are damaging growth

Recently, many observers have tried to make the case that regulatory changes – either implemented or proposed – are causing uncertainty that is keeping businesses from spending money and hiring new employees. We have tried our mightiest to fairly assess this claim. The first difficulty lies in the fact that the vast majority of people making it fail to specify any evidence that could even test the proposition. So, we have tried to figure out what a testable proposition of this might be.

The first thing to look at is the growth of business investment. If firms really are reluctant to make commitments to future production, it should show up in depressed rates of investment relative to previous episodes of recovery from recession. The figure below shows that business investment is actually quite strong in the current recovery.



Another obvious place to look for regulatory burdens (or any other) that are strangling businesses ability to be profitable is profits per unit sold. This measures is at its highest level in over 40 years – measured both as pre- and post-tax profitability. Given that businesses are making record profits on every unit shipped today, it seems odd indeed to think that regulatory changes now or in the future would keep them from shipping as much as possible. Of course, what would keep them from shipping all they can today is the real cause of the economy's poor performance – slack demand for goods and services.



Lastly, even if firms were reluctant to commit to *permanent* acquisitions of capital or labor, if this reluctance was all that was holding back production than we should expect to see them using their *incumbent* factories and staff at peak capacity. They're not. Average hours per employee still have not recovered their pre-recession peak, and capacity utilization rates remain very, very low relative to other non-recessionary periods.

In short, there is nothing to suggest in the macroeconomic data that regulatory change or uncertainty about it is holding back the economy's performance. It's worth noting that the opposition to regulatory changes based on claims of its "job-killing" characteristics has been consistently overblown for decades – Irons and Shapiro (2011) have provided an excellent overview of the hyperbolic claims and review of the economic evidence.

Conclusion

In normal times, regulatory changes have an almost totally neutral impact on employment growth. Any economist who tells you otherwise is lying or misinformed. In times like today – with very high rates of unemployment, regulatory change that induces job-creating investments from corporations that are sitting on plenty of savings but finding no other incentive to make these investments – such regulatory changes can boost job-growth.

Both the macroeconomic data and the review of the air toxics rule argue strongly that regulatory change, while not a jobs-program per se, would only nudge up the level of job-creation in the US economy.

To be clear, the most relevant debate about any regulation – and the air toxics rule specifically – would focus simply on the cost/benefit analyses. On this measure, the air toxics rule is a no-brainer, with benefits to health and quality of life dwarfing the compliance costs of meeting its mandates. But since opponents of the rule have demanded to fight on the much less-relevant ground of jobs, it is worth highlighting that even on this their arguments are wrong. First, it is a modest job-creation strategy, and, second, the best time to undertake these regulatory changes are precisely times like today, when the economy is starved of job-creating investments like the ones this rule would induce.

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