Are there long-run effects of the minimum wage?

Isaac Sorkin

University of Michigan, 611 Tappan St., Ann Arbor, MI 48109, United States

A B S T R A C T

An empirical consensus suggests that there are small employment effects of minimum wage increases. This paper argues that these are short-run elasticities. Long-run elasticities, which may differ from short-run elasticities, are policy relevant. This paper develops a dynamic industry equilibrium model of labor demand. The model makes two points. First, long-run regressions have been misinterpreted because even if the short- and long-run employment elasticities differ, standard methods would not detect a difference using US variation. Second, the model offers a reconciliation of the small estimated short-run employment effects with the commonly found pass-through of minimum wage increases to product prices.

© 2014 Elsevier Inc. All rights reserved.

Inflation and rising real wages make most minimum wage increases temporary.[1] As such, the empirical minimum wage literature has made substantial progress estimating the *short-run* employment effects of minimum wage increases. This effect appears to be small.[2] Despite apparent consensus, the profession remains divided about the employment effects of minimum wage increases.[3]

A reasonable reading of this divide is that there are some questions about the effects of minimum wage increases for which the empirical consensus provides the answer. For other questions, however, economists extrapolate differently depending on whether they think that the relevant short- and long-run employment elasticities differ.[4] To the question: "What is the employment effect of a temporary nominal minimum wage increase likely to be?," the empirical consensus suggests that there are unlikely to be significant employment effects because similar increases have not resulted in significant employment effects. To the question: "What is the employment effect—after a few years—of a permanent minimum wage increase?," the empirical consensus suggests an answer only if the short- and long-run elasticities of minimum wage

---

E-mail address: isorkin@umich.edu.

[1] This observation is not new. Stigler (1946, p. 358) opens with: "The minimum wage provisions of the Fair Labor Standards act of 1938 have been repealed by inflation." Baker et al. (1999) also emphasize the temporary nature of minimum wage increases in the United States. Of course, there might still be persistent shocks. See the end of this introduction and Section 6 for more discussion.

[2] Card and Krueger (1995), Brown (1999) and Neumark and Wascher (2008) survey the vast minimum wage literature. Autor et al. (2010, p. 4, n 6) write "We assume no disemployment effects at the modest minimum wage levels mandated in the US, an assumption that is supported by a large recent literature." Such literature includes Card and Krueger (1994) and Dube et al. (2010). There exist papers that find larger elasticities (e.g. Baskaya and Rubinstein, 2012).

[3] An IGM Expert Panel question on February 26, 2013 asked for responses to the statement: "Raising the federal minimum wage to $9 per hour would make it noticeably harder for low-skilled workers to find employment." In the certainty-weighted responses 40% agreed and 38% disagreed with 22% uncertain. See http://www.igmchicago.org/igm-economic-experts-panel/poll-results?SurveyID=SV_br0IEq5a9E77NMV.

[4] Indeed, Brown (1995) and Hamermesh (1995) discuss the possibility of the short- and long-run differing as an important limitation of the results in Card and Krueger (1995). And Neumark and Wascher (2008, p. 65) emphasize the importance of considering long-run impacts.

increases are the same. In the United States, this latter question is of immediate policy relevance: President Obama's 2013 State of the Union address contained a proposal to index the Federal minimum wage to inflation, which would be a more permanent increase.

To contribute to this important debate, this paper studies the empirical implications of a model that has a distinction between the short- and long-run employment elasticities. The model is based on the putty-clay nature of capital. It was first informally discussed in the minimum wage context by Card and Krueger (1995, pp. 366–368) and I build on the Gourio (2011) version.[5] In the model, when firms pay the entry cost of building a machine, they can freely substitute between capital and labor. Once capital is installed, a firm cannot change its labor demand. The key features of the model are that the labor demand choice of an entering firm is a forward-looking, dynamic, decision that depends on the (expected) stochastic process for minimum wages. And because only some firms adjust each period, the industry-level labor demand response to a minimum wage increase is slow, and also depends on the stochastic process for minimum wages.

The model has two main empirical implications. The first empirical implication is that the reduced-form long-run effects estimated in the literature are essentially uninformative about the true long-run elasticity. I simulate employment data from the model to replicate the dataset used in Dube et al. (2010).[6] They find very small short-run employment effects and, using a common reduced-form long-run regression, no distinction between the short- and long-run employment effects of minimum wages in the United States. They interpret these results as evidence against the view that short- and long-run elasticities differ.[7] On the simulated data, however, the reduced-form regression recovers a long-run employment effect that is barely different than the short-run employment effect.[8]

The second empirical implication is that the putty-clay model is consistent with the pass-through of minimum wage increases to product prices commonly found in the literature, even though minimum wage increases are relatively temporary. Card and Krueger (1994, p. 792) emphasize that their finding of product price rises in response to minimum wage increases are inconsistent "with models in which employers face supply constraints (e.g., monopsony or equilibrium search models)." Despite this, the minimum wage literature has focused on models of search frictions to rationalize the small employment effects, without focusing on the price results.[9]

Fig. 1 suggests why the stochastic process apparently generating US Federal minimum wage variation is unpromising for finding long-run effects: the variation in the real value of the Federal minimum wage follows a "sawtooth" pattern of regular nominal increases that are temporary because they are eroded by inflation and rising real wages. Meer and West (2013, p. 10) provide evidence that state-level variation is similar.[10] As such, other countries might present promising opportunities for finding long-run effects. Unfortunately, the literature suggests that such opportunities are few and far between (or difficult to exploit). For example, in Dolado et al. (1996)'s comprehensive survey of minimum wages in Europe, they do not distinguish between short- and long-run responses. Pereira (2003) studies an interesting coverage change in Portugal, and finds slightly larger effects at a two year horizon than a one year horizon, but does not study longer-run effects. And Lemos (2007) emphasizes that in Brazil minimum wage increases are similarly temporary due to high inflation. The main exception—also emphasized by Neumark and Wascher (2008)—is Baker et al. (1999). They find larger long-run effects of minimum wage increases in Canada than in the US and suggest that this is due to the variation in the US being less permanent than that in Canada.[11] Their long-run elasticity is around −0.6, which is similar to the long-run elasticity in my model.

---

[5] Putty-clay technology was originally developed in Johansen (1959). The main contribution relative to Gourio (2011) is to place the model in industry equilibrium by adding a product demand curve to endogenize product prices and study the dynamics of labor demand. Previously putty-clay technology has been used to study the effect of energy price changes on the economy (e.g. Atkeson and Kehoe, 1999), business cycles (Gilchrist and Williams, 2000) and asset pricing (Gourio, 2011). By deriving dynamic labor demand from dynamic industry equilibrium, the model in this paper is similar to the dynamic labor demand model based on embodied technology in Caballero and Hammour (1994). Aaronson and French (2007) also discuss putty-clay technology in the minimum wage context.

[6] Neumark et al. (2013) argue that the identification strategy in Dube et al. (2010) is problematic because border counties are not a good control group. In simulated data, the border counties are an appropriate control group for the empirical exercise the literature has focused on.

[7] This interpretation has entered the policy discussion. Greenstone (2013) writes: "The empirical evidence now pretty decisively shows no employment effect, even a few year later. See Dube, Lester and Reich in the REStat."

[8] These panel regressions are a generalization of difference-in-differences. An important challenge in implementing difference-in-differences is to identify a suitable "control" group for the "treated" location. Difference-in-difference faces an equally important challenge to identify the "after" period that contains the treatment effect of interest. In the minimum wage case, the treatment effect of interest is the long-run employment response, which is confounded both by the presence of dynamics in the response, and by the time-varying treatment. Keane and Wolpin (2002) highlight a similar challenge with measuring the behavioral response to welfare.

[9] Examples include Rebitzer and Taylor (1995), Burdett and Mortensen (1998), Flinn (2006), and Ahn et al. (2011). Bhaskar and To (1999) is an exception. They demonstrate in a monopsony model with entry and exit that if a minimum wage increase induces enough exit, there is enough substitution towards capital, and product market power increases rapidly enough in exit, then it is possible to have both product price increases and employment increases. The theoretical contribution of this paper relative to Bhaskar and To (1999) is to offer a way of reconciling price and employment results in a model with perfect competition in both the product and employment markets.

[10] In the 2000s, 10 states started indexing their minimum wages to the CPI. Seven states did so in 2007 and one in 2006. Because of the comparatively small number of changes, the Federal minimum wage increase in mid-2007 and a recession starting in late 2007, this does not provide a compelling source of variation to study the long-run effects of indexed changes.

[11] Similarly, Meer and West (2013) argue that temporariness of minimum wage increases means that it is easier to find effects in *flows* (hiring and separation rates) rather than *stocks* (employment levels) and find some effects on flows consistent with negative employment effects. Dube et al. (2011), Brochu and Green (2013) and Gittings and Schmutte (2013) present related analyses of labor market flows following minimum wage increases.