

Extended Abstract

A Sizable Increase in the Minimum Wage and a Lower VAT: Identifying their Effects on Prices in Mexico

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In January 2019, the minimum wage increased in the Mexican Border with the United States by a 100%. At the same time, the value-added tax (VAT) rate was cut in half in that region, from 16% to 8%. In contrast, the minimum wage increased by 16.21% in the rest of the country, with no reduction in the VAT. We use the regional variation in these changes to estimate the effects of these minimum wage and VAT policies on prices in the Northern Mexican Border.

The simultaneous implementation of the minimum wage and VAT reforms poses an identification challenge. On the one hand, comparing the prices of goods that pay VAT (“VAT goods”) between the border and the rest of the country would confound the effects of the minimum wage and the VAT. On the other hand, comparing the prices of goods that do not pay VAT (“Non-VAT goods”) across areas would only be informative about the effects on non-VAT goods.

We therefore propose an empirical approach that, by accounting for potential differential effects of the minimum wage on prices of goods with and without VAT, allows us to identify both effects separately. Indeed, we exploit variation in the incidence of the minimum wage across and within areas. Across areas, we use the differential policy increase in the minimum wage and reduction of the VAT rate. Within areas, we use variation in the percentage of workers affected by the minimum wage increase across sectors. Affected workers are those whose wage in December of 2018 was below the new minimum wage effective in January

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2019. The fraction of affected workers is also known as the “bite” of the minimum wage (Card, 1992; Stewart, 2002; Lemos, 2009; Cengiz et al., 2019).

Our research contributes to the literature on the effects of the minimum wage and the VAT on prices. A survey by Lemos (2008) shows that for developing countries, such as Brazil and Costa Rica, there are significant price effects of higher minimum wages. More recently, Harasztosi and Lindner (2019) show a significant pass-through of minimum wage increases to prices in Hungary, such that 75% of the minimum wage increase is paid for by consumers. Leung (2020) shows that grocery prices increase around 0.6% for a 10% increase in local minimum wages in the US. On the VAT side, Benedek et al. (2015) estimate a 30% pass-through of VAT rate reductions into consumer prices. We contribute to this literature by providing estimates in the context of a large increase in the minimum wage and a simultaneous VAT reform, and by posing an identification strategy that allows us to tease out the effects of each policy change.

We also contribute to an emerging literature about the price effects of the minimum wage and the VAT in the Mexican context. For the policy changes in Mexico studied in this paper, Campos-Vazquez and Esquivel (2020) estimate a combined effect on the consumer price index in the Mexican border of - 1.8 percentage points (p.p), based on aggregate data. They conclude that this points towards a negligible effect of the minimum wage on prices, but do not provide separate estimates for the effect of each policy. For a previous VAT reform, Mariscal and Werner (2018) estimate a 20% pass-through of a VAT increase to prices.

1 Methodology

We estimate the effect of the policies on VAT and non VAT goods separately. For VAT goods, we estimate the effect of the minimum wage using the variation in the fraction of workers affected by the minimum wage increase across sectors. We use micro-data on prices of goods and services from the National Consumer Price Index. Our data contains bi-monthly prices for more than a hundred thousand items from January 2017 to December 2019. We use a two-way fixed effects strategy:

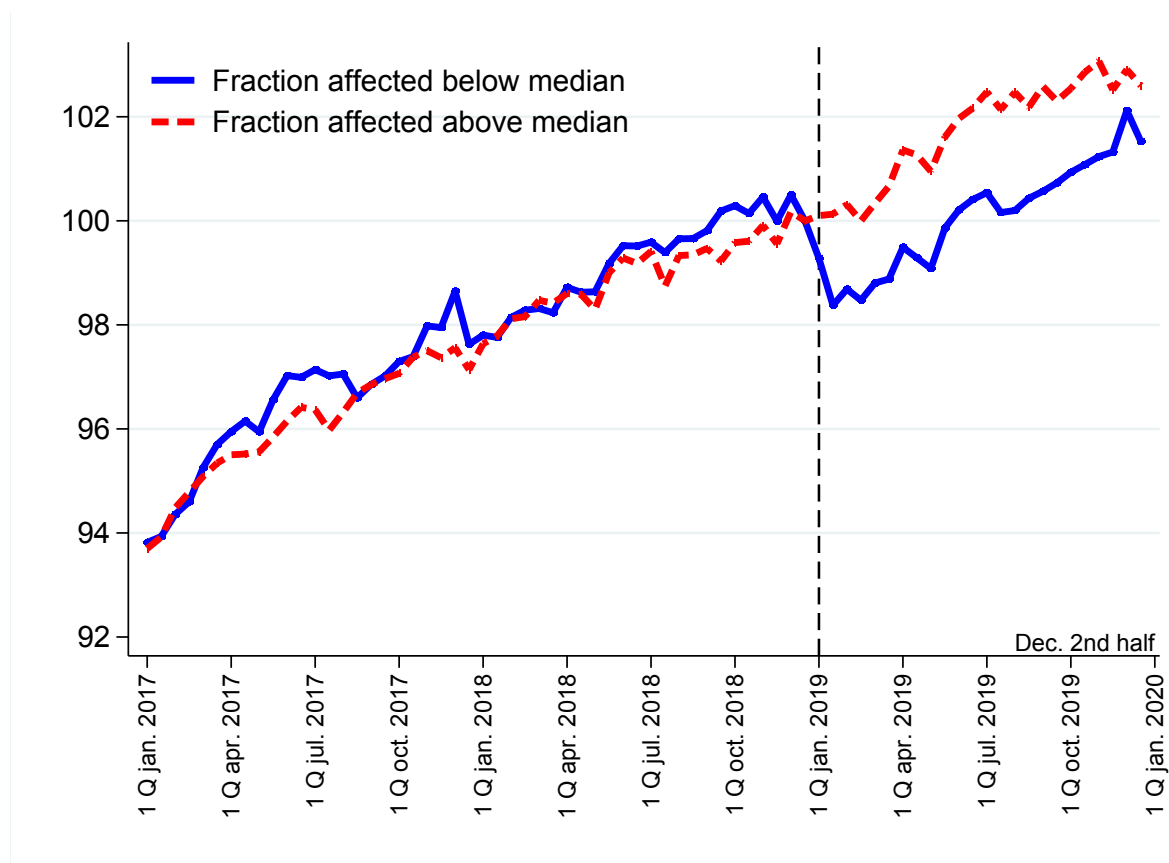
$$\log(P_{ijt}) = \beta_0 + \delta_t + \delta_j + \theta_{MW}^{VAT} Post_t \times Fraction Affected_j + \beta_1 Sale_{ijt} + \varepsilon_{ijt}. \quad (1)$$

Here, P_{ijt} is the price of item i for good j at time t . A good is a general product category, such as “soda”, while an item is a specific product, such as “orange soda of brand X in Mexico City”. Note that a good may encompass several items. $Post_t$ is a dummy variable equal to one starting in January of 2019. $Fraction Affected_j$ is the percentage of workers who earned below the new minimum wage in December of 2018 in the sector that produces good j . $Sale_{ijt}$ is an indicator for sales. ε_{ijt} is an error term. The coefficient θ_{MW}^{VAT} measures the effect on prices of an extra 1 p.p. in the fraction affected. The coefficients δ_t and δ_j are time and good fixed-effects, respectively.

This identification strategy relies on a differential impact of the minimum wage across sectors with different fractions of affected workers (Stewart, 2002; Cengiz et al., 2019; Ha-

rasztosi and Lindner, 2019). We show evidence of this differential impact in Figure 1, which shows the evolution of prices for goods and services that pay VAT in the Northern Mexican Border, where the minimum wage increased by a 100% and the VAT rate was cut in half. These goods are produced in sectors with a varying share of workers affected by the minimum wage increase. The median share of workers affected across goods and services is 19.06%. The prices of goods that were produced with a share of affected workers above the median do not show a change in their trajectory, despite the fact that the VAT decreased. In contrast, the prices of goods produced with a below-median share of affected workers show a substantial decrease at the beginning of 2019.

Figure 1: Price Indexes for VAT Goods and Services in the Mexico-US Border
Index, Dec. 2nd half = 100



Note: Each index is the simple average of price indexes across goods and services that pay VAT. The average excludes the price indexes for energy, government services, housing and education. The median fraction of workers affected by the minimum wage increase across goods and services was 19.06% in the 2nd half of December, 2019. Sources: Authors' calculations, Banco de Mexico, INEGI and IMSS.

To estimate the effect of the minimum wage on non-VAT goods, and the effect of the VAT

on VAT goods, we estimate a triple difference model and exploit the geographical variation of the minimum wage and the VAT:

$$\begin{aligned} \log(P_{ijct}) = & \gamma_0 + \gamma_1 Post_t + \gamma_2 Border_c + \gamma_3 VAT_j \\ & + \theta_{MW}^{NOVAT} Post_t \times Border_c + \beta_4 Post_t \times VAT_j + \beta_5 Border_c \times VAT_j \\ & + \theta_{VAT}^{VAT} Post_t \times Border_c \times VAT_j + \gamma_6 Sale_{ijct} + \gamma_{ct} + \varepsilon_{ijct}. \end{aligned} \quad (2)$$

Here, P_{ijct} is the price of item i for good j in city c at time t . $Border_c$ is an indicator for cities in the Mexico-US border and VAT_j is an indicator for goods that pay VAT. The coefficient θ_{MW}^{NOVAT} measures the effect of the minimum wage increase on the price of non-VAT goods. The coefficient θ_{VAT}^{VAT} measures the effect of the VAT reduction on the prices of VAT goods. The coefficients γ_{ct} are city-time fixed effects.

2 Preliminary Results

Table 1 summarizes preliminary results from the estimation of equations (1) and (2). The size of the estimated coefficient $\hat{\theta}_{MW}^{VAT}$ implies that a VAT good that was produced with a 50% fraction of affected workers, saw its prices rise by 3.98% (0.000795×50) relative to a good produced without affected workers, as a consequence of the minimum wage increase. The average VAT good saw its price increase by 2.35%, since the average fraction affected is 29.55%. At the same time, the average VAT good saw a price reduction of 1.78% associated with the VAT rate decrease of 8 p.p. Non-VAT goods saw an average price increase of 0.3% due to the minimum wage increase.

Table 1: Coefficient estimates

Equation (1)	θ_{MW}^{VAT}	0.000795*** (0.000192)
	N	246,410
	R^2	0.124
Equation (2)	θ_{MW}^{NOVAT}	0.00329* (0.00174)
	θ_{VAT}^{VAT}	-0.0178*** (0.000488)
	N	1,350,240
	R^2	0.074

Note: The table shows results from the estimation of equations (1) and (2). For the first row in equation (1), standard errors are clustered by city and industry. For the rows in equation (2), standard errors are two-way clustered by item and city. *: $p < 0.1$; **: $p < 0.05$; ***: $p < 0.01$. Source: Authors' calculations.

3 Concluding Remarks

We conclude that the minimum wage increase in the Mexican-US border had a statistically and economically significant effect on prices in this area. This effect on the Northern Border's price level was offset by the effect of the VAT decrease. We highlight that the heterogeneous impact of the minimum wage on VAT and non VAT goods is important for minimum wage policy design.

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