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JEL Classification: E24, F41, J64, N14

Keywords: N/A

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Devaluation, Exports, and Recovery from the Great Depression*

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Abstract

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There are few Englishmen who do not rejoice at the breaking of our gold fetters. We feel that we have at last a free hand to do what is sensible ... It may seem surprising that a move which had been represented as a disastrous catastrophe should have been received with so much enthusiasm. But the great advantages to British trade and industry of our ceasing artificial efforts to maintain our currency above its real value were quickly realised ... whereas a tariff could not help our exports, and might hurt them, the depreciation of sterling affords them a bounty.

– J. M. Keynes, 1931[1]

1 Introduction

Unemployment was a persistent and costly problem for policymakers in interwar Britain. The unemployment rate averaged over 10% throughout the 1920s and doubled during the Great Depression. It was also a primary concern of John Maynard Keynes in the period before the *General Theory*. While he proposed many policy solutions to Britain's mass unemployment – including tariffs, public works, and other fiscal stimulus programs – the "rejoicing" he described upon Britain's devaluation points to his longstanding concern over the impact of the gold standard on the export industries. To Keynes, the sudden departure, which finally occurred only because it had become "unavoidable," provided necessary relief to British industries while still maintaining the honor of the Bank of England.

According to textbook accounts of the slump, Keynes' exuberance was warranted, as the departure from the gold standard is seen as the turning point that boosted international competitiveness, enabled monetary expansion, and reversed inflation expectations (Morys 2014; Crafts 2018). However, evaluating interwar policy has been a major challenge in the historiography because the clustering of "changes at a similar point in time makes it extremely difficult to distinguish individual policy impacts" (Solomou 1996, p. 112).

In this paper, we assess the effect of the 1931 devaluation on unemployment. We compare how unemployment rates changed in industries with high and low export intensity after Britain left the gold standard. This quasi-experimental difference-in-differences approach isolates the impact of devaluation on open industries while holding fixed the national monetary policy environment and expectations, which did not vary by industry. Our analysis is based on a newly-constructed, high-frequency micro dataset collected from primary sources. We match monthly unemployment data by industry, which were reported in the

[1] Printed in Keynes (2013a, pp. 245–246).

Labour Gazette, to export intensity in 1930, which was captured in the 1930 *Census of Production*, for a common sample of 75 industries.

We find that devaluation lowered the unemployment rate by 2.7 percentage points in export-intensive industries compared to those that were relatively closed. This result is economically meaningful, statistically significant, and robust to a number of alternative specifications. Prior to leaving the gold standard, the export industries had higher unemployment rates than non-export industries – by 6.1 percentage points on average.[2] The effect of the departure from the gold standard was therefore to reduce the difference in unemployment rates between the export and non-export industries by almost half.

However, the differential effect is not necessarily equal to the aggregate. Therefore, we develop some simple counterfactual simulations that allow for general equilibrium effects. The central case suggests that devaluation reduced the aggregate unemployment rate by 1.5 percentage points through the export channel alone.[3] In the context of the high unemployment rates of late 1931, this is a modest effect in relative terms but large in absolute terms, translating into 140,000 fewer people out of work.[4] Based on the prevailing unemployment benefits, this was equivalent to 0.6% or 0.7% of government spending, which was a welcome boost to the dire fiscal position. Another way of scaling the estimated effect of devaluation is through Okun's law, which relates changes in the unemployment rate and GDP growth. Given the relatively strong negative relationship in interwar Britain, the reduction in the unemployment rate was associated with an estimated boost to economic growth of 0.6 to 0.9 percentage points.

In summary, the departure from the gold standard had a large and significant impact on unemployment rates in export-intensive industries. This translated to a reduction in the aggregate unemployment rate, an improvement in the fiscal position, and an upturn in GDP growth. As monetary freedom was not fully exploited until June 1932 and expectations did not decisively change until January 1933 (Lennard et al. 2023), we conclude that the impact of devaluation on the export industries was an initial spark in the economic recovery from the Great Depression.

This paper connects to several strands of literature. The first relates to the aggregate economic impact of devaluation. The international evidence, which studies samples of economies including the UK, shows that devaluation stimulated economic recovery from the Great Depression. Eichengreen and Sachs (1985)

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[2]This was because of structural shifts after World War I in trade and production as well as the decision to return to the gold standard at its pre-war parity with the dollar.

[3]The macro impact is lower than the micro because not all industries were exporters and exposed to devaluation through the export channel.

[4]This is comparable to the estimated short-run employment effect of Keynes and Henderson's stimulus proposal (Dimsdale and Horsewood 1995).

demonstrate a positive association between depreciation and industrial production and exports between 1929 and 1935. This classic paper has been revisited using modern methods in causal inference. Bouscasse (2023) confirms that the effects of devaluation are not just correlations but causal and Ellison et al. (2023) show that leaving the gold standard raised inflation expectations and lowered real interest rates. For the United States, Candia and Pedemonte (2021) find that city-level and national economic activity increased after abandoning the gold standard in 1933. For the United Kingdom, while the existing evidence is less quantitative, the standard narrative is that the departure from the gold standard was a pre-condition of economic recovery (Solomou 1996; Morys 2014; Crafts 2018).

The second relates to devaluation, trade, and recovery in interwar Britain. Broadberry (1986, p. 129) uses an elasticities framework to estimate that depreciation raised the volume of exports by 12% and reduced imports by 4.5%, which boosted GNP by 3%. Others have studied the national accounts. Solomou (1996, p. 122) highlights that "during the early recovery phase of 1932-5 ... a revival of exports gave a kick to the economy out of depression," although the initial competitive advantage of the early devaluers was eroded as others followed.[5] Middleton (2010), focusing on the longer interval of 1932-7, argues that "net export growth made no contribution to GDP growth."

The third revolves around other economic outcomes of the break from gold. Lennard et al. (2023) showed that although there was a fleeting uptick in inflation expectations after devaluation, there was not a sustained shift until early 1933, after which inflation expectations were a major stimulus to the economy. Lennard (2020) found that leaving the gold standard came at a cost as the switch from a familiar fixed exchange rate to a new floating regime raised economic policy uncertainty. Paker (2023b) suggests that the departure from the gold standard improved labor market fluidity in terms of the reallocation of workers across industries in aggregate. Chadha et al. (2023) studied pass-through, estimating that import prices and wholesale prices fell in 1931 and 1932, as the stimulus to import prices from depreciation was offset by the global slump in export prices.

The fourth strand of literature is on the industrial and regional aspects of interwar unemployment. Many previous studies have used the *Labour Gazette* data on unemployment by industry to consider the drivers of unemployment in interwar Britain (Booth and Glynn 1975; Gazeley and Rice 1992; Bowden et al. 2006; Luzardo-Luna 2020). Paker (2023a) documented unemployment patterns by industry, gender, and region, demonstrating the large disparities in unemployment rates between export-intensive and non-export-intensive industries. Recent work has focused on the role of labor mobility in interwar unem-

[5] This point is also made by Morys (2014, p. 247).

ployment. Paker (2023b) found that barriers to worker mobility across industries contributed to high levels of interwar unemployment, while Luzardo-Luna (2022) found a role for inter- and intra-regional frictions.

The fifth is on theoretical models of devaluation in the 1930s. Eichengreen and Sachs (1985) develop a two-country model predicting that a unilateral devaluation "increases output and employment in the devaluing country," which operates through four principle channels: "real wages, profitability, international competitiveness, and the level of world interest rates." Bouscasse (2023) simulates an open-economy New Keynesian model, which suggests that output rises and the real interest rate falls for countries that devalued.

We contribute to this literature by combining new data and causal methods to document the micro and macro impacts of the export channel of devaluation on recovery in the United Kingdom for the first time.

The paper is structured as follows. Section 2 provides additional context on Britain's departure from the gold standard and evidence that this was an unanticipated policy shock. Section 3 describes our data, research design, and identifying assumptions. Section 4 presents the main results as well as a set of sensitivity exercises. Section 5 considers the aggregate impact of our estimated micro effects. Section 6 concludes.

2 The departure from the gold standard

The British economy faced multiple challenges in September 1931. The economy was deep in recession, as economic activity had declined by 7 per cent from the peak in the first quarter of 1930 following the onset of the global Great Depression (Mitchell et al. 2012; Broadberry et al. 2023). Deflation and deflationary expectations had long set in (Capie and Collins 1983; Lennard et al. 2023). Unemployment rates topped 20%, posing a social and fiscal challenge. Policymakers were constrained in addressing these challenges by the balanced budget orthodoxy, which ruled out fiscal stimulus in peacetime, and by the gold standard, which limited monetary expansion (Crafts 2013).

The first shift from these constraints was the break from gold on 21 September 1931.[6] The ultimate cause was the tension between the objective of restoring full employment and the austere policy required to save the gold standard, as pursuing one was inconsistent with the other (Eichengreen and Jeanne 2000). The proximate cause was a run on the pound. Introducing the Gold Standard (Amendment) Bill

[6] The decision was announced on 20 September 1931 through a press release by the Treasury (National Archives 1931). The legislation then passed through Parliament on 21 September 1931 (Morrison 2016).

in the House of Commons, the Chancellor of the Exchequer, Philip Snowden, summarized that "in the last few days the withdrawals accelerated very sharply. On Wednesday, it was £5,000,000; on Thursday, £10,000,000; on Friday, nearly £18,000,000. And on Saturday, a half day, over £10,000,000 ... Altogether, during the last two months, we have lost in gold and foreign exchanges a sum of more than £200,000,000." (Hansard 1931b, cols. 1294-1295). Snowden describes reaching out to the United States and France for assistance but being told that the scale of support required was untenable. The only remaining option was to suspend the Gold Standard Act.

An interesting historical question is whether devaluation was expected. This is also an important empirical detail as an assumption of our research design, difference-in-differences, is no anticipation, which implies that devaluation has no causal effect before it happens (Roth et al. 2023). The historical evidence suggests that this was indeed unexpected given the government's staunch commitment to gold. Keynes, who was at the time deeply involved in economic policymaking through the Macmillan Committee and the Economic Advisory Council, wrote to his friend Walter Case as late as 14 September 1931 noting that he did not expect devaluation to occur: "It is quite clear that at the point which things have now reached, our choice lies between devaluation, a tariff[,] ... and a drastic reduction of all salaries and incomes in terms of money ... But an extraordinary feature of the situation is that our so-called National Government has been formed on the basis of the members of it promising one another not to adopt any of the three remedies ... So I suppose we shall drift along from the last crisis to the next" (Keynes 2013b, p. 605).

Montagu Norman, the Governor of the Bank of England, had been abroad so did not even know that Britain had left the gold standard until he arrived in Liverpool on 23 September. According to his biographer, Henry Clay, "Nothing could have been a greater blow: he was profoundly depressed and for a time his temper showed it" (Clay 1957, p. 399). The news was so unexpected that when the Deputy Governor tried to warn Norman before he arrived with a cryptic telegram, Norman did not understand what he meant (Clay 1957, p. 399).

What about the markets? A common measure of expectations of devaluation is the forward premium: the difference between the forward and spot exchange rate. Under a credible peg, the forward premium will fluctuate within a narrow band around zero. For a peg under threat, the premium will plummet. Based on the dollar-pound (3-month) forward premium, Eichengreen and Hsieh (1996, p. 372) conclude that "there is little evidence ... [of] a significant perceived probability that sterling would be devalued. As late as the month before the event, it appears, devaluation would have come as a surprise."

To confirm this result for a broader basket of currencies, we collect the spot, 1-, 2-, and 3- month forward exchange rate for the exchanges on Amsterdam, Brussels, Paris, and Zurich from the 'Forward Exchange Rates' section of the *Financial Times* every Friday.[7] Belgium, France, Netherlands, and Switzerland were core to the gold bloc, declaring a joint commitment to the gold standard in 1933 and remaining on until 1936 (Hsieh and Romer 2006). As a result, variation in the forward premium should mostly reflect British expectations of devaluation.

Figure 1 plots the log level of the (3-month) forward and spot exchange rate for the four currencies before and after departure. The forward premium – the difference between the log of the (3-month) forward and spot exchange rate – hovered around zero for much of 1931. From August, however, the premium drops, ranging between -0.1% and -0.5%, which could indicate rising expectations of devaluation.[8] Yet the standout feature is that, although markets had priced in future depreciation of up to -0.5%, the spot price fell by 21-24% at the end of September and by 31% at the close of the year, suggesting that devaluation was largely unexpected.[9]

How did this substantial and largely unanticipated depreciation affect British industries? As a lower exchange rate makes exports cheaper in foreign markets, a natural channel to focus on is exports. Did devaluation benefit exporters over non-exporters? And was it a mean-preserving redistribution between industries or did devaluation have important aggregate effects? It is to these questions that we now turn.

3 Research design

3.1 Data

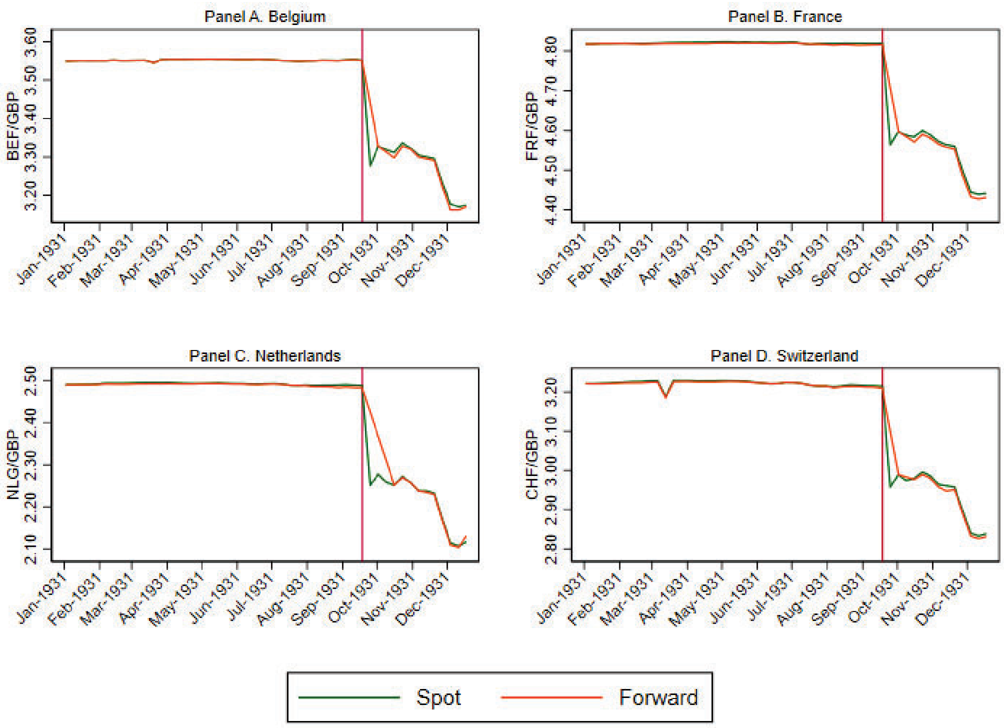
To identify the causal impact of devaluation on unemployment, we assign treatment and control groups based on an industry's propensity to export their output. The treatment group consists of export-intensive industries that are sensitive to devaluation owing to their participation in international trade. The control group consists of domestic production or service industries that are less sensitive to devaluation because they are less exposed to exchange rate shocks. Treatment occurs in September 1931, when Britain switched from a fixed exchanged rate under the gold standard to a floating regime.

[7] If prices were not reported for a Friday, because of Good Friday, for example, we use the prices for the previous day. When bid and ask prices were reported, we transcribe both and calculate the arithmetic mean.

[8] These results are robust to using the 1- and 2- month forward contract.

[9] We will revisit the assumption that devaluation was unanticipated with direct tests in the next section.

Figure 1: Exchange rates



The spot and (3-month) forward exchange rate are displayed in logs. Based on data reported in the 'Forward Exchange Rates' section of the *Financial Times*.

We therefore require high-frequency data on industry-level unemployment outcomes as well as a measure of openness for each industry. Counts of the numbers unemployed in 100 industries were published each month in the interwar period by the Ministry of Labour in the *Labour Gazette*. These data came from the operation of the national unemployment insurance scheme and therefore include only insured workers. The unemployment insurance scheme in interwar Britain covered most manual workers and some lower-paid non-manual workers.[10] These data are generally thought to be reliable, having been collected by the interwar British government, and broadly representative despite covering only insured workers. While subsets of these data have been used in many previous studies on interwar unemployment, the complete monthly data were only recently digitized and made available in Paker (2023a).

We take the monthly number of workers unemployed in all 100 *Labour Gazette* industries for the five months before and after the 1931 devaluation: April 1931 to February 1932. We select these dates to provide a balanced pre- and post-treatment window while excluding the period from March 1932, when

[10]Some industries were excluded from the program including civil servants, domestic service, and agriculture. Feinstein (1972) calculated that 83.2% of unemployed workers in the 1931 *Census of England and Wales* were covered by the unemployment insurance program. Paker (2023a) provides a more detailed discussion of the representativeness of these data.

industry unemployment rates may have been affected by the General Tariff.[11] While the Ministry of Labour reported numbers unemployed each month in the *Labour Gazette*, the number of insured workers in each industry was only established once a year in July. We therefore linearly interpolate the numbers insured in each industry to achieve a monthly unemployment rate, though we show in our sensitivity analyses that our results are robust to using the July figure in the denominator.

To capture industries' exposure to devaluation, we collect data from the 1930 *Census of Production* on the percentage of an industry's output that was exported. The *Final Report on the Fourth Census of Production* was published in five volumes covering 121 industries including all manufacturing industries, mining, building, and "productive services" of utilities and government. In all industries, firms with fewer than 10 workers were excluded. The reports of most industries contain estimates of the percentage of their production that was exported. This is calculated as total exports divided by total production. These calculations are always reported as a percentage, but in some cases they are calculated with production and exports in terms of value, and in other cases they are calculated with production and exports in terms of volume. Some industries report multiple primary products: for example, the saddlery and harness industry reports production and exports for saddlery and harnesses; trunks, bags, and other solid leather goods; fancy goods of leather and artificial leather; and other non-apparel or sporting leather goods (*Census of Production* 1930, vol. 1, p. 355). In instances like these, we totaled exports of all products and production of all products before calculating the percentage exported.

We matched the industries from the 1930 *Census of Production* to the *Labour Gazette* industries according to the mapping provided in Appendix Table A1. Three *Census of Production* industries were unable to be matched, and many needed to be aggregated to match to the *Labour Gazette*, leaving 75 industries. To aggregate industries, we took an average of the percentage of production exported for the relevant industries, weighted by the number of persons employed in that industry as reported in the *Census of Production*. In some cases, a *Census of Production* industry matched multiple *Labour Gazette* industries, which we aggregated by summing the numbers unemployed and insured.[12]

Of the 121 *Census of Production* industries, exports were not reported in 37 cases. In some cases this was because the industry was a small subcategory, e.g. "Fish Curing," while in other cases this was because the industry had negligible exports, e.g. "Building." Our method of aggregation handles these distinctly when both are set to zero. "Fish Curing" becomes part of the larger category "Food

[11] Note that our results are generally robust to lengthening or shrinking this window.

[12] Thirteen industries from the *Labour Gazette* do not map to the *Census of Production* such as distributive trades; commerce, banking, insurance, and finance; and laundries.

Industries Not Separately Specified" when matched to the *Labour Gazette*, and this zero has no impact on the weighted average. The resulting percentage of output exported for "Food Industries Not Separately Specified" is 5.67%, estimated from the subcategories large enough to report exports (Bacon Curing and Sausage; Butter, Cheese, Condensed Milk, and Margarine; Preserved Foods; Sugar and Glucose). In contrast, exports for building remain zero even when combined with public works contracting to match with the *Labour Gazette*, as both industries had genuinely negligible exports. In the final matched data, ten industries had zero output exported.[13] Table 1 shows that the average percentage of output exported was 14.33%. The industries with the greatest export share were engineering and shipbuilding.

Table 1: Summary statistics

	N	Mean	SD	Min	Max	p25	p50	p75
Percent of Output Exported	825	14.33	14.83	0.00	80.07	1.87	11.60	21.50
Indicator for Export Industry	825	0.56	0.50	0.00	1.00	0.00	1.00	1.00
Unemployment Rate	825	22.53	10.85	4.39	77.10	14.54	20.12	27.70
Male Unemployment Rate	825	23.03	10.84	4.15	72.27	14.90	21.29	28.60

Unemployment rate data from the *Labour Gazette*. Percentage of output exported from the 1930 *Census of Production* – see text for construction notes. April 1931–February 1932.

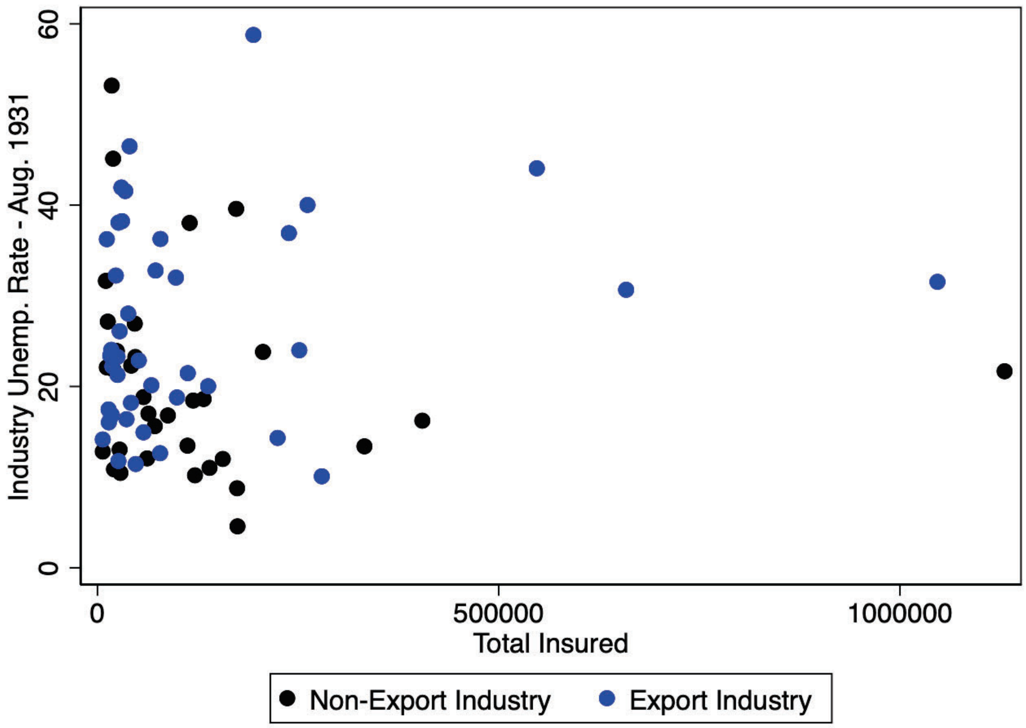
Table 1 also shows the wide range of unemployment rates experienced by industries over this period. The average industry-level unemployment rate overall was 22.53%. The average unemployment rate was slightly higher when only men are considered at 23.03%. While the unemployment rate varies monthly, the industries with the highest unemployment rates on average were Shipbuilding; Lead, Tin, Copper, and Iron Mining; and Jute. The industries with the lowest unemployment rates on average were Tramway and Omnibus Service; Gas, Water and Electricity Supply Industries; and Printing, Publishing, and Bookbinding.

To identify the treatment group, we create a variable *Export* equal to one if the industry exported more than ten percent of its production and zero otherwise. We choose this threshold because, as Table 1 indicates, this creates approximately equally-sized treatment and control groups. We investigate this threshold in more detail below. We also create a variable, *Post*, which equals one if the month is after September 1931 and zero otherwise. The largest export industries were coal mining, engineering, and cotton, while the largest non-export industries were building, clothing production, and government.

The export-intensive industries had, on average, higher unemployment rates than the non-export indus-

[13] Building and Contracting; Canal and Dock Service; Cardboard Boxes and Paper Bags; Gas, Water, and Electricity Supply; Local Government; National Government; Railway Service; Sawmilling and Machined Woodwork; Textile Bleaching, Printing, and Dyeing; Tramway and Omnibus Service.

Figure 2: Industry size and unemployment rates: Export and non-export industries



Analysis using unemployment data from the *Labour Gazette* and percent of output exported from the 1930 *Census of Production*. Export group includes all industries that reported the percent of their output exported in the 1930 *Census of Production* greater than 10%.

tries. In the period before devaluation, from April 1931 through August 1931, the average unemployment rate for the export industries was 25.55%, while the average unemployment rate for the non-export industries was 19.42%. Figure 2 plots the unemployment rate in August 1931 for all 75 industries against their size in terms of total number of insured workers. The blue dots indicate export industries which exported more than 10% of their production in 1930. The black dots are the non-export industries. While there is significant variation in unemployment rates and industry size, there are large industries and industries with high unemployment in both groups. Our measure of export intensity is therefore not simply capturing the largest industries or those with the highest unemployment, even though the average unemployment rate is higher in the export industries than in the non-export industries.

3.2 Model

With all of the key variables constructed, we now turn to the model. We use a difference-in-differences model with industry and month-year fixed effects to estimate the impact of devaluation on unemployment.

Our regression model thus takes the form:

$$U_{it} = \beta + \delta_{DD} Export_i * Post_t + \alpha_i + \tau_t + \gamma X + \epsilon_{it} \tag{1}$$

where U_{it} is a measure of the unemployment rate in industry i at time t, $Export_i$ and $Post_t$ are as defined above, α_i are industry fixed effects, τ_t are month-year fixed effects (i.e. fixed effects for April 1931, May 1931,..., February 1932), and X represents other controls. Because our specification uses industry fixed effects, we only need to control for factors that vary within an industry by month. In some specifications, we therefore control for the log of the monthly estimate of the number insured in each industry.

The coefficient of interest is δ_{DD}, the estimated average treatment effect on the treated (ATT). δ_{DD} captures how unemployment rates for export industries changed with devaluation relative to the change in unemployment rates for non-export industries. $Export_i * Post_t$ equals one if an industry exported more than ten percent of its output and the observation was after September 1931 and zero otherwise.

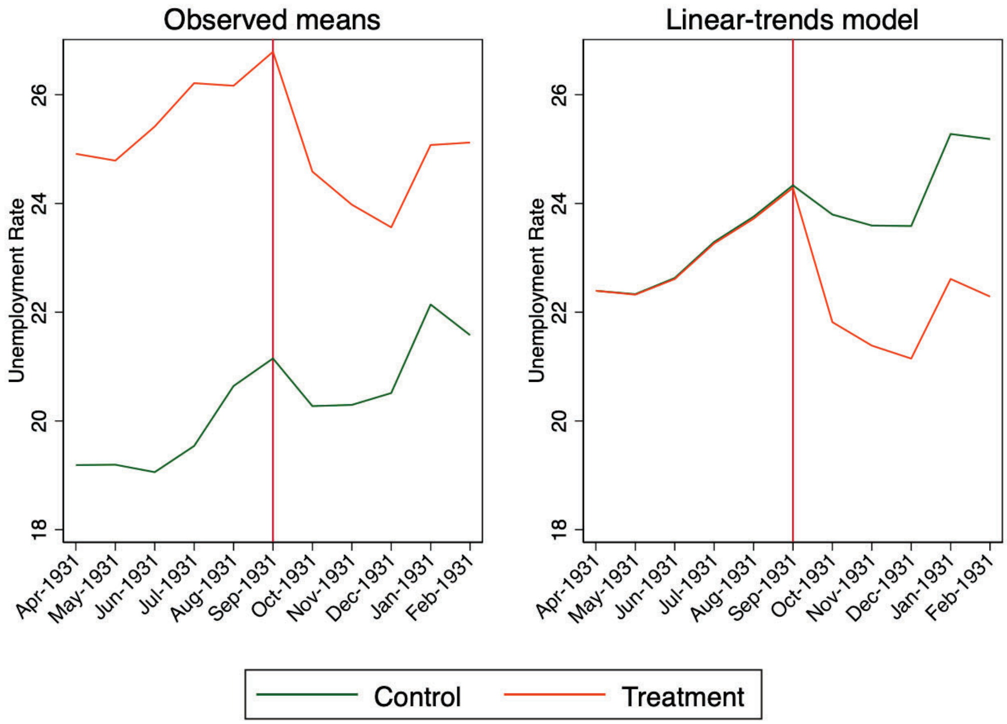
3.3 Identifying assumptions

Identifying the treatment effect requires parallel trends, no anticipatory effects, and no other major institutional or policy changes that differentially impacted treatment and control groups across the threshold.

First, we evaluate whether the trends in the unemployment rate are parallel for the control (non-export) and treatment (export) groups before the devaluation date. Figure 3 provides the standard visual checks of this assumption. The left side of the figure plots the mean of the unemployment rate over the whole period for both groups, while the right side gives the results of a linear trends model. These checks suggest the parallel trends assumption is satisfied. In a hypothesis test of the coefficient on the difference in linear trends prior to treatment, we fail to reject the null hypothesis that the linear trends are parallel, providing additional statistical evidence that this assumption is met ($p = 0.8212$ for Column (1) of Table 2).

The recent methodological literature on difference-in-differences has expressed concern that statistical tests for parallel trends in the pre-treatment period, as we just reported, might fail to reject the null hypothesis owing to low power. Following the recommendations in Roth et al. (2023), we conduct a sensitivity analysis of our findings in Table 2 to violations of the parallel trends assumption using the method in Rambachan and Roth (2023), sometimes referred to as “Honest DiD.” This procedure involves calculating confidence intervals for the treatment effect under different assumptions of how much parallel

Figure 3: Graphical diagnostics: Parallel trends

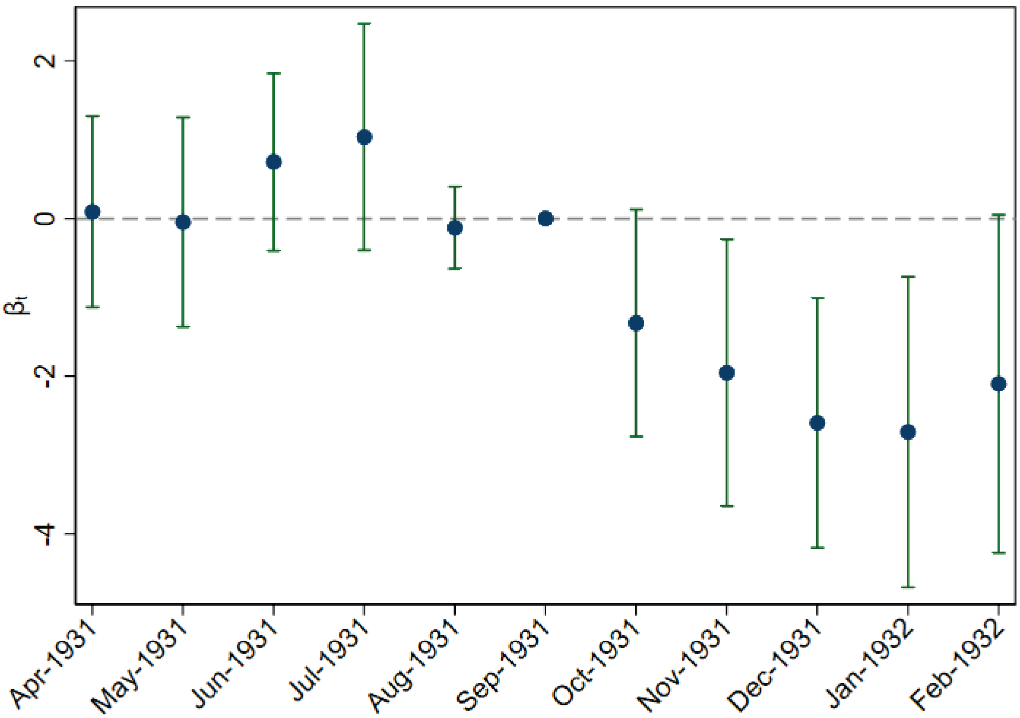


Analysis using unemployment data from the *Labour Gazette* and percent of output exported from the 1930 *Census of Production*. Treatment group includes all industries that reported the percent of their output exported in the 1930 *Census of Production* greater than 10%.

trends could be violated between two consecutive periods. The task is to identify a "breakdown $\bar{M}$," which indicates how bad the violation of parallel trends would need to be to invalidate a significant result. The sensitivity analysis shows a breakdown value of $\bar{M} \approx 1$, which means that the magnitude of any post-treatment violations of parallel trends would need to be as large as the largest pre-treatment violation in order to invalidate the statistical significance of the result in Column (1) of Table 2. While all of our tests suggest the parallel trends assumption is strongly met, this breakdown value suggests our result is only moderately sensitive to the parallel trends assumption to begin with.

Second, we evaluate whether there were anticipatory effects in the standard way by conducting a test in the spirit of Granger causality, which fails to reject that null hypothesis of no anticipatory effects ($p = 0.5671$ for Column (1) of Table 2). This indicates that our model does not suffer from anticipation. We can also consider pre-period and post-period treatment effects in an event study plot, presented in Figure 4. Prior to treatment, there are no significant differences between the treatment group of export industries and the control group of non-export industries. After the treatment, a significant difference emerges, with the unemployment rate lower for export industries than for non-export industries.

Figure 4: Graphical diagnostics: No anticipation



Analysis using unemployment data from the *Labour Gazette* and percent of output exported from the 1930 *Census of Production*. Treatment group includes all industries that reported the percent of their output exported in the 1930 *Census of Production* greater than 10%. Treatment occurred in September 1931. 90% confidence intervals reported.

Third, we are concerned about other possible policy changes that occurred around the treatment date that may have impacted the treatment and control groups differently. One such policy change was the Anomalies Act enforced from October 1931. This Act disproportionately affected women, making it difficult for married women to receive unemployment benefits. This may have impacted the unemployment of women around the time of our treatment, and women were more likely to be in export industries than in non-export industries. To avoid any confounding from the Anomalies Act, we present our results for the full insured population (including women) and for only men, who were not impacted by the Anomalies Act.

Another possible policy change was protection as several imported goods recieved higher tariffs in the second budget of 1931 (Hansard 1931a, cols. 297-312). As a result, we exclude the newly-protected industries in a robustness exercise.

4 Results

Table 2 presents the main results. The average treatment effect is given by the coefficient on $Export_i * Post_t$. This gives the difference in the change in unemployment rates before and after devaluation between the treated and the control groups. Recall that the treated group contains the export industries, exposed to devaluation, while the control group contains the industries that exported less or not at all. The first three columns in Table 2 use the total unemployment rate as the outcome variable, including men and women, while the last three columns use the men's unemployment rate to avoid any confounding from the 1931 Anomalies Act.

Table 2: Treatment effect of devaluation on unemployment rate

	Total			Men Only		
	(1) Baseline	(2) With Control	(3) Weighted	(4) Without Control	(5) With Control	(6) Weighted
ATT						
Export * Post	-2.71**	-2.62***	-6.84***	-2.41**	-2.62***	-6.21***
	(1.03)	(0.98)	(2.28)	(0.95)	(0.98)	(2.27)
Controls						
ln(Number Insured)		9.47			-30.49	
		(27.56)			(22.31)	
Constant	22.28***	-81.74	22.72***	22.39***	344.33	23.12***
	(0.28)	(302.66)	(0.55)	(0.28)	(235.57)	(0.55)
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Month-Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Num. of observations	825	825	825	825	825	825
Num. of industries	75	75	75	75	75	75

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered by industry given in parentheses. Columns (1)-(3) use the total unemployment rate and number insured from the *Labour Gazette*, while Columns (4)-(6) use the men's unemployment rate and number insured for men from the *Labour Gazette*. $Export_i * Post_t$ equals one if an industry reported the percent of their output exported in the 1930 *Census of Production* greater than 10% and if the month was after September 1931. Columns (3) and (6) weight by the number of insured workers in each industry in August 1931.

Focusing on Column (1), which gives the baseline results for the total unemployment rate, the estimate of -2.71 indicates that devaluation lowered unemployment rates by 2.71 percentage points more for export industries relative to the non-export control group. This estimate is statistically significant at the 5% level and is economically meaningful. Prior to devaluation, the unemployment rate was 6.1 percentage points higher for the export industries than for the non-export industries on average. Devaluation therefore almost halved the difference in the unemployment rate between the export and non-export industries.

Column (2) shows that the treatment effect is just slightly smaller at -2.62 ($p < 0.01$) when controlling for the average number of insured workers in the industry. Column (3) weights the model by the number of insured workers in each industry in August 1931. Weighting corrects for the over-representation of industries with a small number of workers in the unweighted regressions that take all industries as equally important. The estimated average treatment effect is greater at −6.84 ($p < 0.01$). This suggests that the finding that devaluation advantaged export industries relative to non-export industries is especially true for the industries that had a larger share of workers in the labor force. The weighted treatment effect can be taken as an approximate population-level impact of devaluation on unemployment. We focus in the rest of this section on the more conservative unweighted estimates, but we consider the implications of this weighted estimate on the aggregate impact in Section 5.

Columns (4), (5), and (6) give the estimates for mens' unemployment rates from a model similar to the baseline, with an industry size control, and weighted by industry size. In general, the estimates are broadly similar to the estimates for total unemployment and are still strongly statistically significant. The estimates are slightly smaller, suggesting that there may indeed have been differences in changes in industry unemployment rates in this period for men and women.

Table 3 explores the robustness of our baseline result to different definitions of export industries and to different measures of unemployment. The first column uses percent of output exported as a continuous measure, while Columns (2) and (3) experiment with thresholds of 5% and 15% for determining export vs. non-export industries. Because of the asymmetric and often small number of clusters in the treated or control groups in these models, the standard errors are robust but not clustered so should be interpreted cautiously. Focusing first on Column (1), the result indicates that a 1 percentage point increase in the share of output exported is associated with a 0.04 percentage point decline in the unemployment rate after devaluation. From Table 1, the standard deviation of the percent of output exported is 14.84, so this means that a one standard deviation increase is associated with a 0.59 percentage point decrease in the unemployment rate. Columns (2) and (3) show that the effect size is consistent, though slightly smaller, when a more or less conservative threshold for identifying non-export industries is used.

Table 3 also explores the robustness of the findings to changes in the outcome measure. Column (4) uses the number unemployed as the outcome, controlling for the log number employed. Column (5) uses the unemployment rate with the raw number of insured in the industry in July as the denominator rather than the linearly interpolated value. The findings confirm the baseline results in Table 2 Column (1).

Table 4 considers the robustness of the findings to different samples. Column (1) calculates effects on

Table 3: Robustness to different measures of export and unemployment

	(1) Cont. Export	(2) Export > 5	(3) Export > 15	(4) Num. Unemp.	(5) Unemp. Rate - July
ATT					
Export * Post	-0.04**	-2.15***	-1.24***	-6698.93**	-2.62**
	(0.02)	(0.46)	(0.46)	(3070.00)	(1.02)
Controls					
ln(Number Employed)				-79059.67**	
				(35154.52)	
Constant	22.28***	22.28***	22.28***	875749.16**	22.13***
	(0.30)	(0.30)	(0.30)	(376376.38)	(0.29)
Industry F.E.	Yes	Yes	Yes	Yes	Yes
Month-Year F.E.	Yes	Yes	Yes	Yes	Yes
Num. treated (Exporter)		49	31	33	33
Num. control (Non-Exporters)		26	44	42	42
Num. of observations	825	825	825	825	825

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors given in parentheses. $Export_i$ equals one if an industry reported the percent of their output exported in the 1930 *Census of Production* greater than 5% or 15% in Columns (2) and (3) respectively. Column (1) uses the continuous export share. Column (4) uses the total number unemployed as the dependent variable, while Column (5) uses the overall unemployment rate where the denominator is the number insured in July.

the intensive margin of exporting by excluding 10 industries with no reported exports in the *Census of Production*. The effect sizes are similar to the baseline model.

Table 4: Robustness to different samples

	(1) Export Only	(2) No Net Importers	(3) No Protected Industries
ATT			
Export * Post	-2.28**	-2.39**	-2.76**
	(1.09)	(1.16)	(1.07)
Controls			
Constant	22.96***	22.28***	22.72***
	(0.31)	(0.29)	(0.29)
Industry F.E.	Yes	Yes	Yes
Month-Year F.E.	Yes	Yes	Yes
Num. of observations	715	825	792
Num. of industries	65	75	72

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered by industry given in parentheses. Column (1) restricts the sample to only industries with non-zero exports, where $Export_i * Post_t$ equals one if an industry reported the percent of their output exported in the 1930 *Census of Production* greater than 10% and if the month was after September 1931. Column (2) re-classifies 13 industries as non-exporters which were indicated net importers in Barna (1952). Column (3) uses the baseline measure of an exporter but drops protected industries from the sample.

As devaluation lowers the price of an industry's output in foreign markets but also raises the price of inputs from foreign markets, an alternative treatment indicator could be based on net exports. This information is not readily available in the *Census of Production*, which only recorded information on retained imports, not imports of intermediate goods used in production. To gauge the importance of this issue, we use the calculations in Barna (1952) of import and export intensity for 36 industries in 1935 to recode export industries from 1 to 0 if the import share was greater than the export share (indicating they were net importers). Unfortunately, this information is only available for a coarser set of industries and well after devaluation, when import and export intensity is likely to have swung towards the latter following the drop in the exchange rate. Keeping these limitations in mind, we recode thirteen of our forty-two export industries to non-export industries based on the classifications in Barna (1952, p. 57).[14] Column (2) shows that, with this revised export measure, the treatment effect is slightly smaller but remains economically and statistically significant.

We also considered whether non-export industries may have been exposed to treatment from devaluation through the increased cost of imports. The data from Barna (1952) indicate that export industries (which exported more than 10% of their production) also had greater imports as a share of output relative to non-export industries. This confirms that our treatment group of exporters was more exposed to devaluation than our control group of non-exporters.

Finally, Column (3) drops three industries that were protected during this period, which we identified using primary sources, to ensure that they are not confounding the results (House of Commons Parliamentary Papers 1938, pp. 208-15).[15] Again, the results confirm the baseline estimates given in Table 2, although the treatment effect is slightly larger.

In Appendix Tables A2 and A3, we present the results of the robustness checks in Table 3 and Table 4 for men only. All of the robustness checks confirm that devaluation caused an economically and statistically significant decrease in unemployment rates in export industries relative to non-export industries.

5 Aggregate impact

How did devaluation affect the recovery from the Great Depression? Following a number of other historical studies (Hausman 2016; Hausman et al. 2019; Chadha et al. 2023), we go from micro to macro using our estimated treatment effect and some counterfactual simulations. This exercise isolates the export channel

[14] These industries are Boot, Shoe, Slipper and Clog Trades; Brass and Allied Metal Wares Manufacture; Hat and Cap (Including Straw Plait) Manufacture; Manufacture of Brass, Copper, Zinc, Tin, Lead, etc.; Manufacture of Tin Plates; Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture; Oilcloth, Linoleum, etc., Manufacture; Paper and Paper Board Making; Rubber Manufacture; Saddlery, Harness and Other Leather Goods Manufacture; Tanning, Currying and Dressing; Tobacco, Cigar, Cigarette and Snuff Manufacture; and Wall Paper Making and Paper Staining.

[15] These industries are Tobacco, Cigar, Cigarette and Snuff Manufacture; Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture; and Drink Industries.

of devaluation but does not include other channels – such as expectations, uncertainty, and monetary policy – because these aggregate factors are "differenced out" in Equation (1) (Nakamura and Steinsson 2014). Focusing on one channel is desirable for studying counterfactuals, as one element varies while others are fixed.

The first step is to define the actual and counterfactual unemployment rate for each industry. Using potential outcomes, the industry-level unemployment rate with devaluation is:

$$E\left[U^1_{it}\middle|\beta, i, t, X, Export_i * Post_t = 1\right] = \beta + \delta_{DD} Export_i * Post_t + \alpha_i + \tau_t + \gamma X.$$

The counterfactual industry-level unemployment rate without devaluation is:

$$E\left[U^0_{it}\middle|\beta, i, t, X, Export_i * Post_t = 0\right] = \beta + \alpha_i + \tau_t + \gamma X.$$

The difference between the actual and counterfactual is $\delta_{DD} Export_i * Post_t$. To calculate the aggregate impact, we weight by an industry's share of total employment, which accounts for an industry's contribution to the aggregate unemployment rate, and sum over all industries:

$$\phi_t = \sum_{i=1}^{I} \delta_{DD} Export_i * Post_t \frac{L_{it}}{L_t}, \tag{2}$$

where L_t is the labour force, given by the number of insured workers. ϕ_t is the change in the aggregate unemployment rate due to devaluation. This setup implies that devaluation has the same effect, δ_{DD}, for all export industries. To give a sense of magnitudes, we calculate the aggregate unemployment rate as:

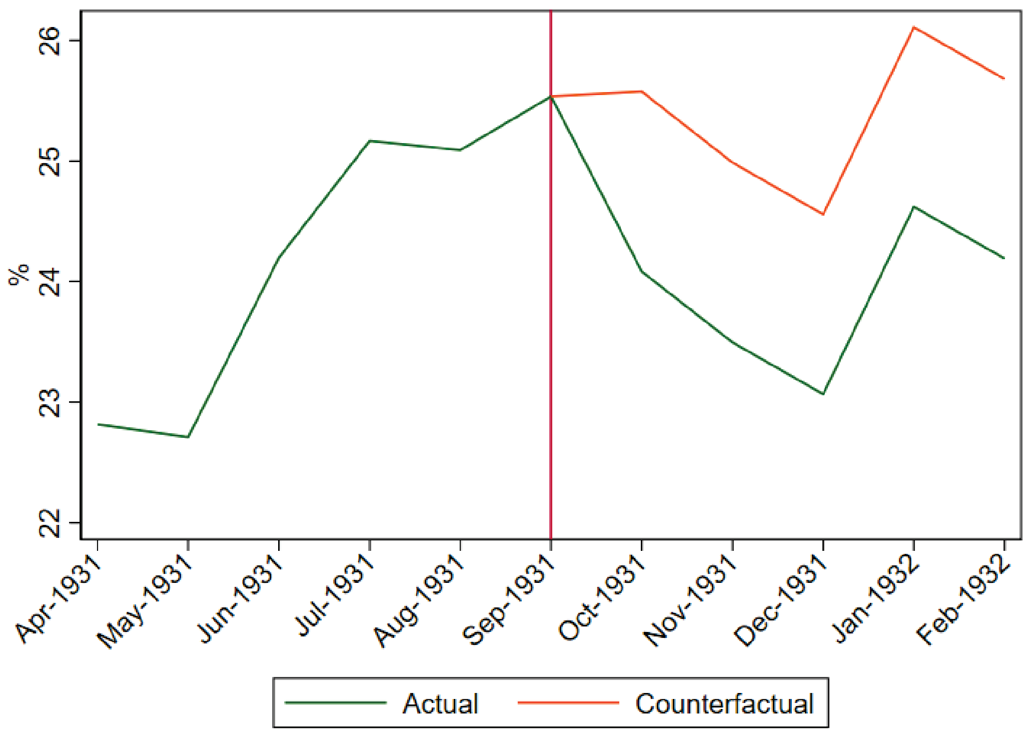
$$U_t = \sum_{i=1}^{I} U_{it} \frac{L_{it}}{L_t}, \tag{3}$$

and the counterfactual aggregate unemployment rate as:

$$\tilde{U}_t = U_t - \phi_t. \tag{4}$$

Figure 5 plots the actual and counterfactual unemployment rate based on the treatment effect presented in Column (1) of Table 2 of −2.71. With devaluation, the actual unemployment rate declined from 25.5% in September to 23.1% in December 1931. Without devaluation, the counterfactual unemployment rate would have been sticky around 25%, creeping down to 24.6% by the end of 1931. Therefore, the the impact of devaluation on exporters lowered the aggregate unemployment rate by approximately 1.5 percentage points (shown by the distance between the two lines in Figure 5). This is smaller than the treatment effect of −2.71 as the aggregate impact accounts for both the share and size of the industries in the treatment and control groups.

Figure 5: Actual and counterfactual unemployment



The actual unemployment rate is calculated using Equation (3). The counterfactual unemployment rate is calculated using Equation (4).

Figure 6 adds in a counterfactual based on the population estimate from Table 2 Column (3) of −6.84, which comes from a model weighted by industry size in August 1931. Using the population effect suggests that the unemployment rate would have risen above 28%. Therefore, relative to this counterfactual, there was a decline in the aggregate unemployment rate of 3.8 percentage points. In the calculations below, we continue cautiously and use the unweighted estimate as the baseline.

Our estimate of the treatment effect, δ_{DD}, tells us how export industries performed relative to non-export industries and suggests that industries that were more open benefited more from devaluation than those that were closed. However, the relative effect is not necessarily equal to the aggregate (Ramey 2011). The aggregate impact could be smaller if there are negative spillovers, such as if a job gained in one industry

Figure 6: Actual and counterfactual unemployment: Alternative δ_{DD}

The actual unemployment rate is calculated using Equation (3). The counterfactual unemployment rate is calculated using Equation (4).

is a job foregone in another, which might hold in a tight labor market. The aggregate impact could be larger if there are positive externalities, such as if the reduction in unemployment for exporters because of devaluation also reduced unemployment for non-exporters, albeit disproportionately.

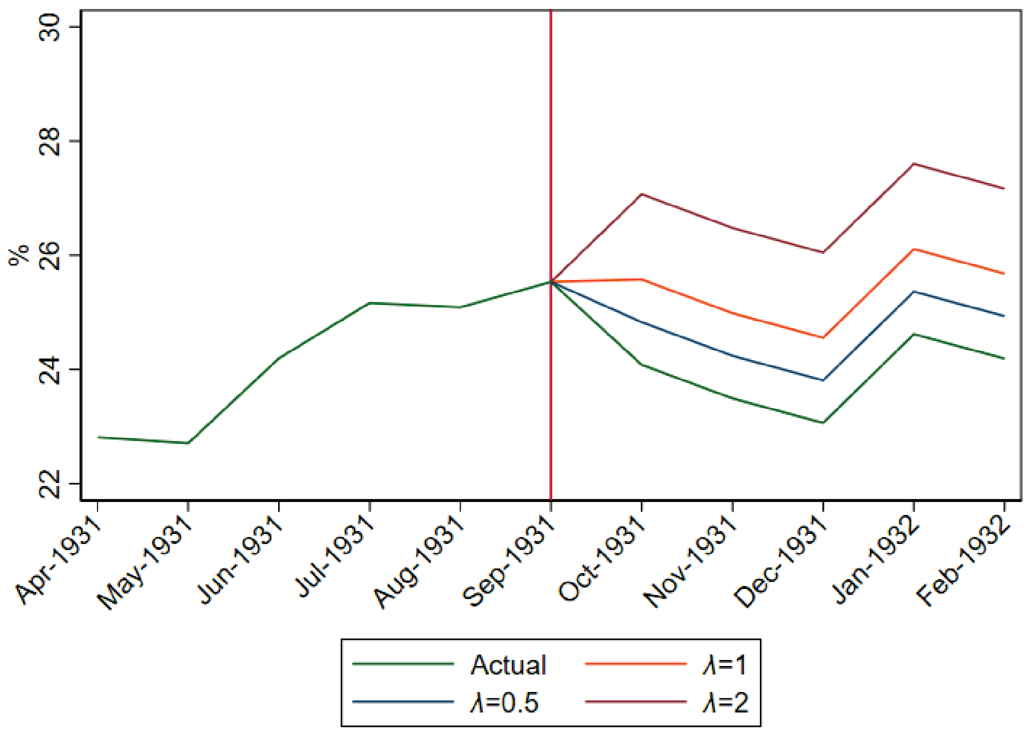
To allow for general equilibrium effects, we can augment Equation (2) with λ, which attenuates, amplifies, or holds constant the treatment effect:

$$\phi_t = \sum_{i=1}^{I} \lambda \delta_{DD} Export_i * Post_t \frac{L_{it}}{L_t}.$$

We consider three values of λ. The first is $\lambda = 1$, which is the baseline case that assumes no general equilibrium effects. The second is $\lambda = 0.5$, which dampens the treatment effect by half. The third is $\lambda = 2$, which doubles the treatment effect. The results are shown in Figure 7. As expected, assuming negative spillovers, $\lambda = 0.5$, halves the aggregate impact; assuming positive spillovers, $\lambda = 2$, doubles the aggregate impact, and so on.

On balance, our sense is that the baseline is most realistic. On $\lambda < 1$, it is difficult to identify a credible mechanism through which job creation in the export industries led to job destruction in the non-

Figure 7: Actual and counterfactual unemployment: Alternative λ



The actual unemployment rate is calculated using equation (3). The counterfactual unemployment rate is calculated using equation (4).

export industries. On $\lambda > 1$, it is quite possible that more jobs and incomes in the export industries raised demand in the non-tradable sectors. For example, building was the biggest employer among the non-export industries. It is plausible that stimulus to the export industries boosted the building of homes and factories for its workers and firms. Other big non-export industries provided staples (such as food, drink, and clothing) and services (such as transport and utilities). However, a large λ results in rising counterfactual unemployment, which is possibly a stretch given the unemployment rate was already so high.

These back-of-the envelope calculations boil down to one estimated parameter, one calibrated parameter, and a few observable variables. This is a simplification of the general equilibrium effects of the export channel of devaluation and holds constant other channels altogether. A potential solution is to develop a structural model. Although this might identify some of the mechanisms through which industries interact, it too would require calibrated parameters.

In the context of very high unemployment, a reduction of 1.5 percentage points is relatively modest, but it is meaningful in absolute terms, translating to about 140,000 fewer people out of work.[16] A useful reference point is Keynes and Henderson's proposal to increase government spending by £100m per annum for three years. Dimsdale and Horsewood (1995) estimate that this stimulus package would have raised employment by 111,000-120,000 in the first year, rising to a peak of 303,000-330,000 by the third year, depending on assumptions about interest rates and crowding out. Therefore, the two policies have similar employment benefits in the short run, though devaluation was much less costly.

This drop in aggregate unemployment would have also had a positive impact on the dismal fiscal arithmetic for the Treasury. With benefit rates of 13s. 6d. for women and 15s. 3d. for men per week from 8 October 1931 (Burns 1941, p. 368), this saved roughly £93,000 a week in benefit payments if we assume that all of the jobs went to women or £105,000 a week if all of the jobs went to men. This is equivalent to 0.6% and 0.7% of weekly government spending (Mitchell 1988).[17]

Another way to measure the aggregate impact is to convert from jobs to output using Okun's law, which is an empirical regularity that holds between the change in the unemployment rate and the growth of GDP (Paker 2023c, for example).[18] Figure 8 plots this relationship for interwar Britain, using data from Thomas and Dimsdale (2017), which is based on Denman and McDonald (1996), for unemployment rates and Mitchell et al. (2012) for GDP. We include regression lines for three different samples: February 1920 to September 1931, April 1925 to September 1931, and February 1920 to December 1938. The figure shows that the negative relationship is robust across samples. The slope, which is the estimated Okun's coefficient, is -0.4 ($t = -5.6$) for the long pre-treatment window, 1920:2-1931:9, -0.6 ($t = -6.9$) for the gold standard era, 1925:4-1931:9, and -0.5 ($t = -7.4$) for the full interwar period, 1920:2-1938:12.[19] Using the lower estimate translates to a one-off jump in GDP growth of 0.6 percentage points; using the upper estimate raises the impact to 0.9 percentage points. As a temporary increase in the growth rate permanently raises the level, these bounds represent a non-trivial contribution to the shoots of economic recovery, especially when we consider that this captures only one channel of devaluation and excludes other potential mechanisms.

A final caveat of these back-of-the-envelope calculations is that they only relate to the industries in our

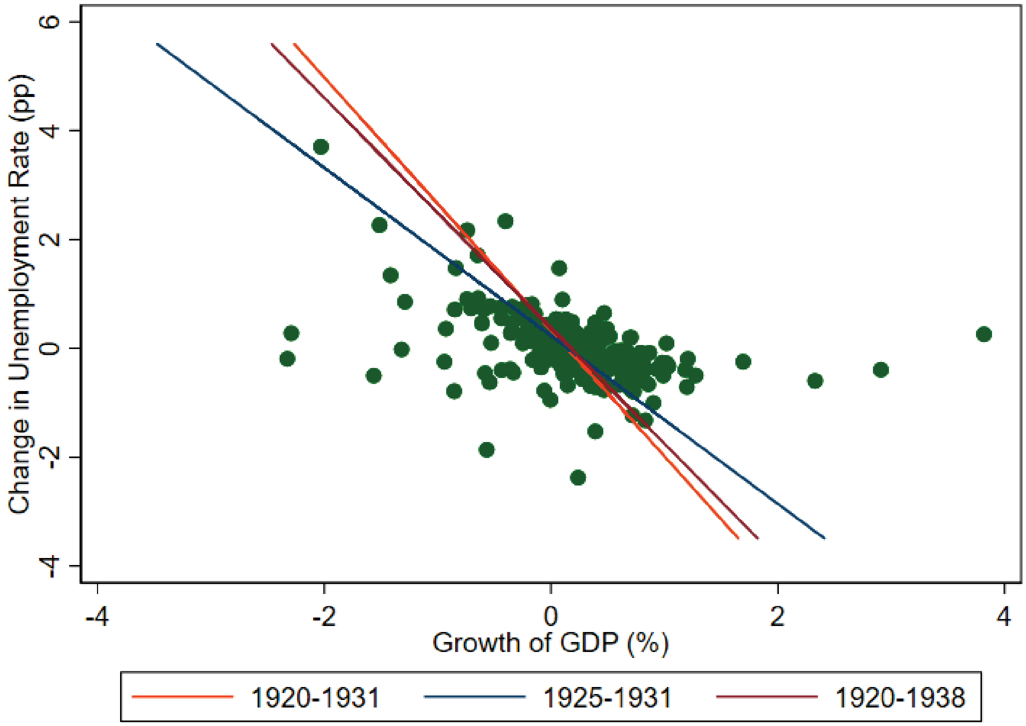
[16]Using our less-cautious population estimate of the aggregate unemployment effect, −3.8 percentage points, the corresponding number is 350,000 fewer people out of work.

[17]There were also specific benefit rates for young men and women (18-20), boys and girls (16-17), adult dependents and dependent children, but these are abstracted from in the analysis (Burns 1941, p. 368).

[18]Okun's Law is sometimes expressed as deviations of output and unemployment from their natural rates. However, while the natural rates can be estimated, our aggregate impact is measured in changes and not deviations from natural rates, and so could not be used in the exercise that follows.

[19]Outliers – observations with month-on-month absolute GDP growth rates of more than 5% – have been dropped. Including them increases the absolute magnitude of the coefficients.

Figure 8: Okun's law



Calculated using data from Denman and McDonald (1996) and Mitchell et al. (2012).

sample, which were covered by unemployment insurance and included in the *Census of Production*. If we had information on unemployment and export intensity for the excluded industries, it is unclear how these estimates would be affected.

To summarize, our micro evidence shows that exporters benefited from devaluation relative to non-exporters, closing the gap in unemployment rates between the two groups by about half. The macro calculations suggest that this was not at the expense of non-exporters, so that the export channel of devaluation stimulated aggregate output and employment. This contributed to the early stages of recovery from the Great Depression. However, we recognize that, for various reasons, the macro estimates are more speculative than the micro.

6 Conclusion

Britain's suspension of the gold standard in 1931 has been described as "one of the most shocking policy shifts in the history of the global economy" (Morrison 2016). This sweeping reform had multiple potential effects: it was a turn in the macroeconomic trilemma that released monetary policy to pursue new objectives, it was a regime change that shifted expectations, and it was a depreciation that improved international competitiveness. In classic accounts, releasing the "golden fetters" is regarded as a prerequisite of the UK's recovery from the Great Depression (Solomou 1996; Morys 2014; Crafts 2018) and contemporary observers such as Keynes certainly regarded it as such (Keynes 2013a, pp. 245–249).

However, there is space for new empirical work that distinguishes between these complimentary channels. In this paper, we focus on the export channel, using quasi-experimental methods to capture how devaluation differentially affected relatively open industries. Our analysis relies on a newly-constructed monthly dataset for 75 industries collected from the *Labour Gazette* and *Census of Production*.

We find that unemployment rates evolved in parallel before devaluation but diverged after. Unemployment rates fell by 2.71 percentage points more in export-intensive industries relative to industries that were more closed. This result, which is robust to many alternative specifications, is also large in magnitude. The export industries experienced much higher unemployment rates than the non-export industries prior to devaluation. Leaving the gold standard reduced this difference by almost 50%, bringing labor market outcomes for workers in export industries into closer alignment with those in non-export industries.

This improvement in the unemployment rate for export industries after devaluation was not a zero-sum game. The jobs created in the export industries were not offset by jobs lost in the non-export industries. According to our counterfactual simulations, our conservative estimates suggest the export channel of devaluation lowered the aggregate unemployment rate by 1.5 percentage points – equivalent to approximately 140,000 fewer people out of work. Through the reduction of unemployment benefit payments alone, this resulted in savings for the Treasury of 0.6% - 0.7% of spending per week. Based on our estimates of Okun's law, we project that this reduction in the aggregate unemployment rate led to a jump in GDP growth of 0.6 to 0.9 percentage points.

When the persistent unemployment of the 1920s collided with the Great Depression, a series of offsetting shocks were required to reverse the vortex of falling output and prices. The evidence we have provided in this paper indicates that devaluation, through the export channel alone, gave an almost immediate boost to relatively open industries. This decrease in unemployment improved the employment situation, the fiscal position, and economic activity. Therefore, the stimulus of devaluation to the export industries was an important initial spark in Britain's economic recovery from the Great Depression. Other channels, such as cheap money and rearmament, reinforced and completed this recovery. While the UK experience is interesting in its own right, this also adds adds important context to the international pattern of devaluation and recovery from the Great Depression so familiar to economic historians.

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Appendices

Table A1: Mapping of *Census of Production* and *Labour Gazette* Industries

Census of Production Industry	*Labour Gazette* Industries
Cotton (Spinning)	Cotton Industry
Cotton (Weaving)	Cotton Industry
Woollen and Worsted	Woollen and Worsted
Silk and Artificial Silk	Silk Industry
Linen and Hemp	Linen
	Hemp Spinning and Weaving, Rope, Cord, Twine, etc., Making
Jute	Jute
Hoisery	Hoisery
Textile Finishing	Textile Bleaching, Printing, Dyeing, etc.
Lace	Lace
Rope, Twine, and Net	Textile Industries Not Separately Specified
Canvas Goods and Sack	Textile Industries Not Separately Specified
Absestos Goods and Engine and Boiler Packing	Textile Industries Not Separately Specified
Flock and Rag	Textile Industries Not Separately Specified
Elastic Webbing	Textile Industries Not Separately Specified
Coir Fibre, Horsehair and Feather	Textile Industries Not Separately Specified
Roofing Felts	Textile Industries Not Separately Specified
Packing	Textile Industries Not Separately Specified
Fellmongery	Tanning, Currying and Dressing
Leather (Tanning and Dressing)	Tanning, Currying and Dressing
Saddlery, Harness and Leather Goods	Saddlery, Harness and Other Leather Goods Manufacture
Tailoring, Dressmaking, Millinery, etc.	Dress and Mantle Making and Millinery
	Blouses, Shirts, Collars, Underclotheing, etc., Making
	Tailoring
Boot and Shoe	Boot, Shoe, Slipper and Clog Trades
Hat and Cap	Hat and Cap (Including Straw Plait) Manufacture
Glove	Dress Industries Not Separately Specified
Fur	Dress Industries Not Separately Specified
Umbrella and Walking Stick	Dress Industries Not Separately Specified
Iron and Steel (Blast Furnaces)	Pig Iron Manufacture (Blast Furnaces)
Iron and Steel (Smelting and Rolling)	Steel Melting and Iron Puddling Furnances, Iron and Steel Rolling Mills and Forges
	Stove, Grate, Pipe, etc., and General Iron Founding
Iron and Steel Foundries	Steel Melting and Iron Puddling Furnances, Iron and Steel Rolling Mills and Forges
	Stove, Grate, Pipe, etc., and General Iron Founding
Tinplate	Manufacture of Tin Plates
Hardware, Hollow-ware, Metallic Furniture, and Sheet Metal	Metal Industries Not Separately Specified
Chain, Nail, Screw, and Miscellaneous Forgings	Bolts, Nuts, Screws, Rivets, Nails, Etc., Manufacture
Wrought Iron and Steel Tubes	Iron and Steel Tube Making
Wire	Wire, Wire Netting, Wire Rope Manufacture
Tool and Implement	Hand Tool, Cutlery, Saw, File Making
Cutlery	Hand Tool, Cutlery, Saw, File Making
Needle, Pin, Fish-hook, and Metal Smallwares	Metal Industries Not Separately Specified
Small Arms	Metal Industries Not Separately Specified
Mechanical Engineering	General Engineering; Engineers' Iron and Steel Founding
	Marine Engineering, etc.
	Constructional Engineering
Electrical Engineereing	Electrical Engineering
	Electrical Wiring and Contracting
	Electrical Cable, Wire, and Electric Lamp Manufacture
Shipbuilding	Shipbuilding and Ship Repairing
Motor and Cycle	Construction and Repair of Motor Vehicles, Cycles and Aircraft
Aircraft	Construction and Repair of Motor Vehicles, Cycles and Aircraft

Railway, Carriage, and Wagon	Railway Carriage, Wagon, and Tram-Car Building
Carriage, Cart, and Wagon	Construction and Repair of Carriages, Carts, etc.
Copper and Brass (Smelting, Rolling, etc)	Manufacture of Brass, Copper, Zinc, Tin, Lead, etc.
Lead, Tin, Aluminium, and Other Non-Ferrous Metals	Manufacture of Brass, Copper, Zinc, Tin, Lead, etc.
Gold and Silver Refining	.
Finished Brass	Brass and Allied Metal Wares Manufacture
Plate and Jewellery	Watches, Clocks, Plate, Jewellery, etc., Manufacture
Watch and Clock	Watches, Clocks, Plate, Jewellery, etc., Manufacture
Grain Milling	Grain Milling
Bread and Biscuit	Bread, Biscuit, Cake, etc., Making
Cocoa and Sugar Confectionery	Cocoa, Chocolate and Sugar Confectionary
Preserved Foods	Food Industries Not Separately Specified
Bacon Curing and Sausage	Food Industries Not Separately Specified
Butter, Cheese, Condensed Milk, and Margarine	Food Industries Not Separately Specified
Sugar and Glucose	Food Industries Not Separately Specified
Fish Curing	Food Industries Not Separately Specified
Cattle, Dog and Poultry Foods	Food Industries Not Separately Specified
Ice	Food Industries Not Separately Specified
Brewing and Malting	Drink Industries
Spirit Distilling	Drink Industries
Spirit Rectifying, Compounding and Methylating	Drink Industries
Aerate Waters, Cider, Vinegar and British Wine	Drink Industries
Wholesale Bottling	Drink Industries
Tobacco	Tobacco, Cigar, Cigarette and Snuff Manufacture
Chemicals, Dyestuffs and Drugs	Chemicals Manufacture
Fertiliser, Disinfectant, Glue, and Allied Trades	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Soap, Candle, and Perfumery	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Paint, Colour, and Varnish	Paint, Varnish, Japan, Red and White Lead Manufacture
Seed Crushing	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Oil and Tallow	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Petroleum Refining	Mining and Quarrying Not Separately Specified
Explosives and Fireworks	Explosives Manufacture
Starch and Polishes	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Match	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Ink, Gum, and Sealing Wax	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Paper	Paper and Paper Board Making
Wallpaper	Wall Paper Making and Paper Staining
Printing, Bookbinding, Stereotyping, Engraving, and Kindred Trades	Printing, Publishing, and Bookbinding
Printing and Publication of Newspapers and Periodicals	Printing, Publishing, and Bookbinding
Manufactured Stationery	Stationery and Typewriting Requisites (Not Paper)
Cardboard Box	Cardboard Boxes, Paper Bags, and Stationery
Pens, Pencils, and Artists' Materials	Stationery and Typewriting Requisites (Not Paper)
Timber (Sawmilling, Etc)	Sawmilling and Machined Woodwork
Furniture and Upholstery	Furniture Making, Upholstering, etc.
Cane and Wicker Furniture and Basketware	Woodworking Not Separately Specified
Wooden Crates, Cases, Boxes, and Trunks	Wood Box and Packing Case Making
Coopering	Woodworking Not Separately Specified
Brick and Fireclay	Brick, Tile, etc., Making
China and Earthenware	Pottery, Earthenware, etc.
Glass	Glass (excluding Bottles and Scientific Glass) Manufacture
	Glass Bottle Making
Cement	Cement, Limekilns and Whiting Works
Building Materials	Artificial Stone and Concrete Manufacture
Building and Contracting	Building
	Public Works Contracting, etc.
Rubber	Rubber Manufacture
Scientific Instruments, Appliances, and Apparatus	Scientific and Photographic Instrument and Apparatus Manufacture
Musical Instruments	Musical Instrument Making
Coke and By-Products and Manufactured Fuel	Coke Ovens and By-Product Works
Fancy Articles	.

Linoleum and Oilcloth	Oilcloth, Linoleum, etc., Manufacture
Brush	Brush and Broom Making
Sports Requisites	Toys, Games and Sports Requisites Manufacture
Games and Toys	Toys, Games and Sports Requisites Manufacture
Manufactured Abrasives	.
Incandescent Mantles	Oil, Grease, Glue, Soap, Ink, Match, etc., Manufacture
Cinematograph Film Printing	Scientific and Photographic Instrument and Apparatus Manufacture
Coal Mines	Coal Mining
Non-Metalliferous (Except Slate) Mines and Quarries, Including Oil Shale Mines	Stone Quarrying and Mining
	Clay, Sand, Gravel, and Chalk Pit Digging
Metalliferous Mines and Quarries	Lead, Tin, and Copper Mining
	Iron Ore and Ironstone Mining and Quarrying
Slate Mines and Quarries	Slate Quarrying and Mining
Salt Mines, Brine Pits and Salt Works	Mining and Quarrying Not Separately Specified
Local Authorities	Local Government
Gas Undertakings	Gas, Water and Electricity Supply Industries
Electricity Undertakings	Gas, Water and Electricity Supply Industries
Water Undertakings	Gas, Water and Electricity Supply Industries
Railway Companies	Railway Service
Tramway and Light Railway Companies	Tramway and Omnibus Service
Canal, Dock and Harbour Companies	Canal, River, Dock and Harbour Service
Government Departments	National Government

TABLE A2: ROBUSTNESS TO DIFFERENT MEASURES OF EXPORT AND UNEMPLOYMENT: MEN ONLY

	(1) Cont. Export	(2) Export > 5	(3) Export > 15	(4) Num. Unemp.	(5) Unemp. Rate - July
ATT					
Export * Post	-0.04**	-1.74***	-1.13***	-4886.75*	-2.17**
	(0.02)	(0.44)	(0.43)	(2921.64)	(0.93)
Controls					
ln(Number Employed)				-79059.67**	
				(35154.52)	
Constant	22.39***	22.39***	22.39***	588061.69*	22.14***
	(0.30)	(0.30)	(0.30)	(299799.64)	(0.28)
Industry F.E.	Yes	Yes	Yes	Yes	Yes
Month-Year F.E.	Yes	Yes	Yes	Yes	Yes
Num. treated (Exporter)		49	31	33	33
Num. control (Non-Exporters)		26	44	42	42
Num. of observations	825	825	825	825	825

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors given in parentheses. $Export_i$ equals one if an industry reported the percent of their output exported in the 1930 *Census of Production* greater than 5% or 15% in Columns (2) and (3) respectively. Column (1) uses the continuous export share. Columns (1)-(3) use the male unemployment rate in the industry as the dependent variable. Column (4) uses the total number of men unemployed as the dependent variable, while Column (5) uses the overall unemployment rate for men where the denominator is the number employed in July.

TABLE A3: ROBUSTNESS TO DIFFERENT SAMPLES: MEN ONLY

	(1) Export Only	(2) No Net Importers	(3) No Protected Industries
ATT			
Export * Post	-2.20**	-2.00*	-2.49**
	(1.02)	(1.06)	(0.99)
Controls			
Constant	23.09***	22.39***	22.91***
	(0.31)	(0.29)	(0.29)
Industry F.E.	Yes	Yes	Yes
Month-Year F.E.	Yes	Yes	Yes
Num. of observations	715	825	792
Num. of industries	65	75	72

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered by industry given in parentheses. The dependent variable is the male unemployment rate in the industry. Column (1) restricts the sample to only industries with non-zero exports, where $Export_i * Post_t$ equals one if an industry reported the percent of their output exported in the 1930 *Census of Production* greater than 10% and if the month was after September 1931. Column (2) re-classifies 13 industries as non-exporters which were indicated net importers in Barna (1952). Column (3) uses the baseline measure of an exporter but drops protected industries from the sample.