Did Henry Ford Cause the Recession of 1926-1927? A Test of the Granular Hypothesis

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Abstract

In 1927, Henry Ford decided to shut down all new automobile production at the Ford Motor Corporation to retool for the transition from the Model T to the Model A. This coincided with the 1926-1927 recession, and often a central role for the recession was attributed to this shutdown. The granular hypothesis of Gabaix argues that large shocks to major firms can generate recessions, and this would seem to qualify as a large shock to one of the largest firms in the U.S. at the time. We examine the granular hypothesis in this context and find it unconvincing. We perform a Bai-Perron structural break test on a bevy of macroeconomic time series and find the shutdown dates don't correspond to structural breaks. Other car companies, especially General Motors' Chevrolet, took advantage of the shutdown to increase their sales, taking market share from Ford and offsetting the decline in automobile production. The recession was well underway by the time of the May 1927 shutdown, and we can detect little change in the course of the recession as a result of the Ford shutdown.

JEL Codes: N12, N62, E32

Keywords: Granular hypothesis, 1926-1927 Recession, Ford Motor Corporation

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"The United States experienced a "recession" in 1927, . . . this episode is thought . . . to reflect primarily the decision of Henry Ford to close down automobile production for six months to permit the changeover from the Model T . . . to the Model A"
(Kindleberger et al. (1986), 43)

1 Introduction

The sun rose on the morning of May 26th, 1927, as it always had. But it was a special day for Henry Ford, a bittersweet day. With much fanfare, the 15 millionth Model T rolled down the production line, one of the last to be ever produced. The day before, Ford had announced that new Model T production would be ended forever (Nevins and Hill, 1957, 430-431). The automobile, which had revolutionized the American auto industry, and was irrevocably associated with its creator, Henry Ford, was no more. At the time it was retired, two in three cars on the road were Model T's.

Ford had resisted calls to plan a replacement, even as falling sales in the mid-1920s meant that a replacement was urgently needed. While rumors had circulated in 1926 that a new Ford was coming, Henry Ford will claimed he would produce his beloved Model T forever (Brinkley and Brinkley, 2003, 347, 349). As a result, all new production of automobiles was shut down at the old Highland Park plant, while the new River Rouge plant was retooled for the next Ford car. No one yet knew exactly what that car would look like, not even Henry himself. Ford and his engineers worked around the clock to design what would become the Model A. In the meantime, 60,000 workers were laid off as no new automobiles were being assembled by Ford. It would take until October for the Model A to be announced, and many (but not all) of the old workforce was rehired by the end of 1927 (Nevins and Hill, 1957, 450-3, 459).

Such a large shock to one of the largest corporations in America occurred at the same time as the recession of 1926-1927, and it has been attributed a causal role in this recession (Nevins and Hill, 1957, 454). The New York World estimated

that 500,000 wage earners would be affected by the Ford shutdown either directly or indirectly. Detroit's commissioner of public welfare claimed that 40% of city's relief cases were tied to the shutdown (Sward, 1968, 201) .

Indeed, this kind of shock to a large firm would be consistent with Gabaix's granular hypothesis, that business cycles can be driven by shocks to large firms. We use this episode as a test of the granular hypothesis. Work by Gabaix and others[1] has posited that shocks to large firms which are important for the aggregate economy will also be important for aggregate fluctuations despite the law of large numbers. The shocks to these firms will not simply be offset by their small share of aggregate output and will have an aggregate impact by nature of their size. As a result, firm-level shocks are not just micro shocks and will have implications for aggregate fluctuations as well.

The Ford shutdown would seem to be the perfect example of this phenomenon, as it consists of a massive, unforeseen shock to a single large firm. In 1929, Ford was the third largest corporation in the country, behind only Standard Oil and General Motors, with revenues exceeding a billion dollars. The Ford Motor Company had larger revenues than US Steel or Sears and Roebuck and General Electric combined.[2] While there is no perfect test, we have a very specific shock here, which is large in magnitude, affecting in one of the largest corporation in the United States at the time.

Despite the size of the shock and the importance attributed in the popular discourse to the total shutdown of Ford Motor production, we find there was little impact on the macroeconomy in the aggregate. The recession itself was short and mild. In any case, the shutdown, which was announced the day before it occurred, began in May 1927 at the midpoint of the wider recession which had begun in October 1926. The Model A began to be produced roughly at the same time as the recession ended in late 1927, though it took some time to ramp up production. While Ford continued to ramp up production until 1929, we will date

[1] See Gabaix (2011); Acemoglu et al. (2012); Barrot and Sauvagnat (2016); Acemoglu et al. (2017); Atalay et al. (2011), as well as others cited in Barrot and Sauvagnat (2016)

[2] Source: Forbes Magazine 50th Anniversary Issue, 9/15/1967

the end of the shutdown to near the end of 1927 when the first Ford Model A's came off the assembly lines and were sold (Nevins and Hill, 1957, 466). With the macroeconomic evidence we have, we find the shutdown had limited impact and was only a minor factor in the recession. The loss of production by Ford was largely offset by increased production by Ford's competitors, including GM, such that the aggregate effect of this granular shock was small.

2 Other Factors in the Recession

The Ford shutdown was, of course, not the only factor in this recession. Oil prices were falling from 1926-1928, cushioning the blow of the downturn (McMillin and Parker, 1994). Though the Hoover administration was concerned with the surging stock market, the Fed resisted calls to tighten monetary policy, making the recession less severe (Ahamed, 2009, 278). International concerns also mattered for the 1926-1927 recession. Churchill's decision to return the United Kingdom to the gold standard at the old parity meant that deflationary pressures and high interest rates were required, causing the 1920s to see high unemployment and much labor unrest (Kindleberger et al., 1986, 32). The United Kingdom saw a massive general strike in 1926 which largely shut down coal and steel production and generated a recession in that country (Robertson, 1926).

In July 1927 the major central bankers of the world, from the USA, the UK, France, and Germany, all met at the home of the Treasury Secretary on Long Island. Conditions in Europe were not good, as the resumption of the gold standard during the interwar suffered from severe imbalances. The UK in particular was perennially short on gold and was forced to have high interest rates. As a result of this meeting, the Fed agreed to lower interest rates to try to repel gold from the United States and attract it to Europe to ease their monetary conditions. The incipient recession certainly confirmed. While not intended to ease conditions domestically, this interest rate cut played a role in the recovery which began in November 1927 which had nothing to do with the Ford Motor Company (Kindle-

berger et al., 1986, 50-1), (Eichengreen, 1996, 213).

3 The Decline of the Model T

Ford had gained a dominant market share with the Model T in the 1910s by producing an inexpensive automobile targeting the mass market. Ford's strategy of standardization and continual improvements were applied to steadily bring down the price of the Model T. In 1921, Ford achieved a 59% market share, the highest ever recorded, and was producing almost half of world automobile output (Nevins and Hill, 1957, 437), (Kuhn, 1986, 312). However, this high-water mark soon passed; the automobile market changed in the 1920s, and the Model T rapidly became an anachronism . The Model T remained inexpensive, but as the used car market grew in importance, it had to compete with used models of higher quality trading at similar prices. Producing a car only in black was another choice that made the Model T cheaper, but consumers wanted more choices and variety. General Motors was waiting in the wings to give the customer what they wanted. By offering different brands and models, GM was able to sell in all market segments (Sward, 1968, 195). General Motors' 1924 market share of 16% would surge to 43% in 1927. General Motor's dominance was essentially made in this period. Strong enthusiasm for Ford's brand-new Model A would reduce GM's market share to 33% in 1929, but it would return to a 43% share by 1931. GM could probably have been even more dominant: Alfred Sloan, the CEO who cemented MG's role as the market leader in the 1920s, set an informal ceiling of 45% market share to avoid antitrust actions, though GM's market share would surpass half in 1954 without pushback (Kuhn, 1986, 313,316).

The Ford shutdown exacerbated the decline of Ford's market share. Unsurprisingly, rival auto companies took advantage to increase their market share at Ford's expense. Chrysler began its rise to be one of the "Big Three" automakers during this period (Nevins and Hill, 1957, 469). General Motors was very successful in gaining market share during this period. The Chevrolet brand, in particular,

was priced to compete with Ford in the low-cost market but offered a wider array of standard features in addition to greater variety of styles and options. General Motors had invested $10 million in new production capacity in 1926, before the shutdown was even announced, so they were well positioned for 1927, when they sold twice what Ford did (Brinkley and Brinkley, 2003, 347,352).

To evaluate the change in market share, we constructed a weighted sales measure which adjusts for quality differences by weighting raw automobile production for each company by the prices of the individual make/models. Our main source for quantity data is Jerry Heasley's *The Production Figure Book For U.S. Cars*, which is a collection of data on production quantity at the model year (and where available, body style) level for all major American makes up through the early 1970s (Heasley, 1977). For the largest automakers, including Ford, Chrysler, AMC, and most divisions of GM, the original source of the data were the firms' respective public relations departments; these data were supplemented for these and lesser makes by information from auto clubs. Price data were obtained from Kimes and Clark's *Standard Catalog of American Cars* 1805-1942, which also contains quantity data for many makes which largely corroborates the data in Heasley (Kimes and Clark, 1989).

While Ford's weighted sales in 1927 were a bit more than a quarter what they had been in 1926, Chevrolet's weighted sales almost tripled in just one year. Chrysler, the #3 automaker at the time, increased its sales by 12% in that year. Other GM marques also did very well: the Pontiac brand increased sales by 76%, and even high-end Cadillac saw a 27% increase. Auburn automobiles more than doubled their weighted sales, and Hudson increased their weighted sales by 21%. Despite the collapse of Ford's sales, overall weighted sales increased by 4% for the entire industry even as the overall price level fell slightly (1926 was the peak prior to the Depression).

The overall changes can be seen in Figure 6. The size of the bubbles is the annual sales in 1926, and the blue shading is the share of vehicles which are low cost, and thus more likely to be close substitutes for Ford's Model T. Ford

itself is shown in black (of course), with its revenues collapsing from 1926-1927. Chevrolet, despite having gained market share and revenue previously, still saw a large rise in revenue. This makes sense, as the lower priced cars Chevrolet sells would be closer substitutes for Ford's inexpensive automobiles. In general, the trend line shows that lower priced cars saw larger revenue increases, while higher priced cars saw almost no change. The outliers are Cadillac, who was booming due to better management and sales performance specific to this period, as well as Durant & Star, Oakland, Dodge, and Kissel, who were collapsing for reasons unrelated to the Ford shutdown.

Otherwise, the effect is very clear and the various makes follow a clear negative sloping relationship between revenue changes and market segment. On net, the competitive effect more than offset the effect of Ford shutdown, and automobile sales were higher in 1927 than they had been in 1926, even in a recession year. Given this fact, it is hard to see how the shutdown could have had a large effect macroeconomically. Nevertheless, the composition of production might matter, with the negative effect from the layoffs at Ford more negative than the positive effects of additional overtime work for existing workers at other manufacturers. Next, we consider other time series to see if there is evidence of a marked decline from the Ford shutdown.[3]

4 Macroeconomic Time Series

We begin by looking at various time series. We will first simply use an ocular test to see if the shutdown period corresponds to economic weakness in sectors affected by the shutdown of automobile production in one of the largest corporations. We will then use a structural break test to see if econometric techniques will indicate that Ford's shutdown were important for the American business cycle.

[3] Seasonal adjustment using X-13 technique. Recession dates from NBER.

4.1 Automobiles

The most direct evidence is from new car production, as displayed in Figure 7a. Here, we do see that production seems to decline faster after the shutdown and production recovers after the shutdown ends. But the effect is not that much larger, and auto sales had already been declining since early 1926, before the recession started. Another possible impact: the shutdown could clearly lead to a decrease in the purchases of automobile parts, with such a large factory idled, shown in Figure 7b . There is a brief decline with the beginning of the shutdown, but then shipments of parts resume their upward trend, which had begun at the start of the recession.

We do see a decline in automobile factory employment on impact of the shutdown in Figure 7c, but the declines are smaller than in many recessions, including those of 1920-1921, 1924-1925, and of course, 1929-1933. Factory payrolls for U.S. automobiles picks up the amount being spent on workers in U.S. automobile factories. Given the size of the shutdown, one would expect this variable to fall rapidly if other companies were not ramping up production. However, these payrolls are almost unchanged during the shutdown, consistent with other producers increasing hours per worker during the shutdown to try to ramp up production.

If the number of cars sold fell significantly, we might be able to find an effect on gasoline consumption, as gasoline is primarily consumed by automobiles. Here we find little effect in Figure 7e. Rubber is important for automobile tires, and so we should see a decline in Rubber consumption if auto production is severely disrupted from a shutdown. Even so, we see no real decline in rubber consumption in Figure 7f as rubber consumption continues to grow at trend during the shutdown period, as it did in the first half of the recession. New auto registrations had been declining in the recession and continued to decline at the same rate in the later phases of the recession. Auto registrations do seem to recover at the end of the recession, coinciding with the end of the shutdown as seen in Figure 8a.

4.2 Manufacturing

Industrial Production in manufacturing does decline as a result of the shutdown, while it had been roughly constant previously as can be seen in Figure 8b. This is consistent with continuing sales out of inventories with the decline in production from Ford not offset by manufacturing elsewhere. Manufacturing output falls slightly during the shutdown.Production of durable manufactures declines a bit faster after the shutdown relative to prior. For Real Manufacturing Output, we see little decline, even after the recession began, though the shutdown period does see a decline while the start of Model A sales sees a rebound. This is graphed in Figure 8d, Truck Production does see a decline on impact of the shutdown and then is fairly flat, as can be seen in Figure 8f. Truck Registrations, Figure 9a, are similar to production but smoother and following a lag. Here again, we find that the same trends continued as before, and there was a slight uptick before the end of the shutdown. While the number of manufacturers failing during the shutdown period continues on a general upward trend, the liabilities of failed manufacturers is little changed during the shutdown period, as can be seen in Figures 9b and 9c.

4.3 Labor Markets in Manufacturing

Output per production worker manhour, a measure of productivity in manufacturing, does decline slightly during the shutdown, but remained close to trend (Figure 9d). We also look at manufacturing earnings, as they might fall if hours get cut for manufacturing workers. There is a slight decrease here, though these kinds of fluctuations appear during other periods and are mild relative to 1920-1921 or 1929-1933, as can be seen in Figure 9e.

We also look at overall manufacturing production worker employment, who are the workers directly involved in production like those on assembly lines. Here we see, in Figure 9f a slight acceleration of a downward trend through the end of the recession, but the decline is smaller than for production. Per capita earnings of wage earners in U.S. manufacturing fell slightly during the shutdown, but the

decline is slight, consistent with a mild recession or sticky wages (Figure 11a).

Gross hires in manufacturing continue on a downward trend that began in 1926, while net hires during the shutdown decline very slightly during the shutdown and fall more during the recessionary period before the shutdown (Figure 10b). The discharge rate of manufacturing workers spikes on impact of the shutdown, perhaps unsurprisingly, as these Ford employees would be discharged during the shutdown to be rehired at a later date. We do not, however, see persistent discharges over the following months as a result of the shutdown.

The total separation rate, which includes both involuntary separations as well as voluntary separations such as quits, continues its downward trend during the shutdown, and even falls on impact from the shutdown: we do not see large numbers of jobs destroyed during the shutdown (Figure 10e). Indeed, the overall layoff rate is basically flat during this period, further evidence that this was not a period where manufacturing as a whole saw significant weakness as a result of the shutdown, as can be seen in Figure 10f. We'd expect fewer workers to quit their jobs if finding a new job is difficult, the quit rate continues along the downward pretrend during the shutdown. In sum, for manufacturing labor markets, there is little evidence of a recession at all, both before and after the shutdown.

4.4 Business Cycle

Department stores sales tend to be sensitive to the economic cycle. As can be seen in Figure 11b, these decline sharply during the Great Depression. These sales do decline slightly in the first half of the recession, but they actually rise over the period of the shutdown, so there is no evidence for a large negative effect from the shutdown.

Retail trade is similarly correlated with the overall business cycle, and here we again see an increase during the shutdown, consistent with economic strength rather than weakness (Figure 11c). We could also look at the production of consumer's goods excluding automobiles, in Figure 11d, to see if the shutdown caused broader economic weakness. There is a bit of a decline following the shutdown,

but it's not much different than other fluctuations seen in business cycle expansions .

We also consider the population of Michigan, in Figure 11f. Was this shutdown important enough to engender a decrease in population in Michigan? It appears the answer is no. Is there evidence from other data series that might indicate the severity of the downturn as a result of the shutdown? We see in Figure 11e that people were not postponing shoe purchases due to the severity of the recession; in fact, we see the opposite— that shoe sales actually increased during the shutdown.

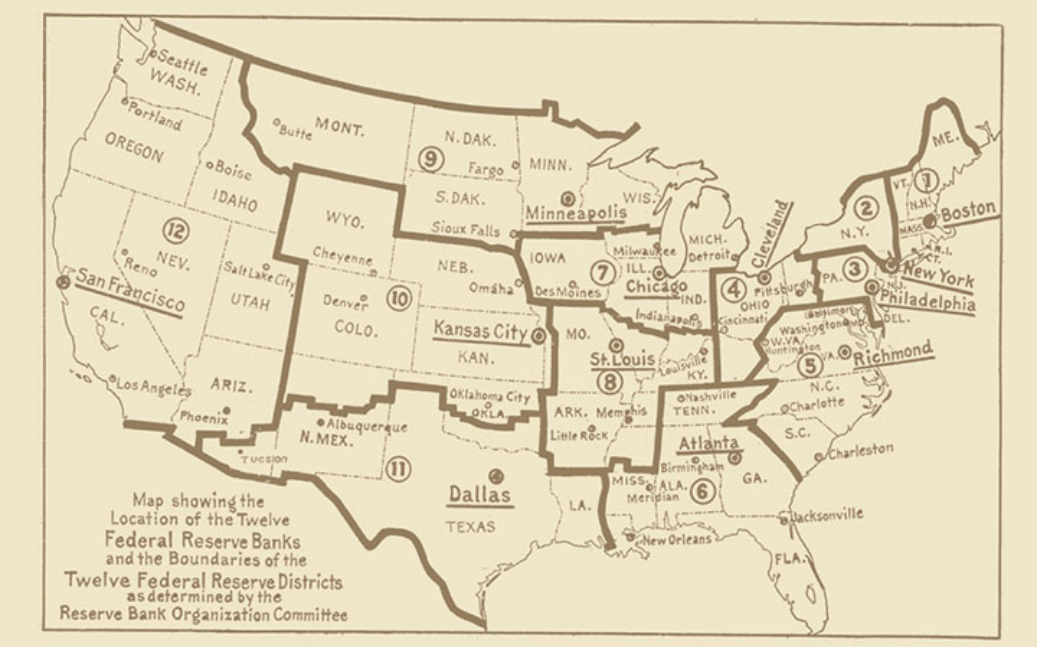
4.5 Structural Break Tests

While our ocular examination of macroeconomic time series above are informative, we want to test for the importance of the shutdown more rigorously. To do so, we perform a Bai and Perron (2003) structural break tests on the above series. If the events surrounding the shutdown are important, we should see this reflected as identification of these dates as being important structural breaks in the data. We present the data in two ways, first visually in Figure 12, and then as a Table, in Table 1. When we consider the entire interwar period from 1919-1940, essentially none of the structural break tests identify the shutdown periods as important structural breaks. When we limit the consideration to only 1923-1929, then some series show the end of the shutdown as a significant structural break, but this is also near the end of the recession, and so this may be spurious. The start of the shutdown does not appear as a structural break.

5 Fed District Retail Sales

While using national data can be informative, we have subnational data that can further identify whether there was a significant economic shock centered around Michigan around the time of the Ford shutdown. The Federal Reserve published

Figure 1: Federal Reserve Districts, 1913

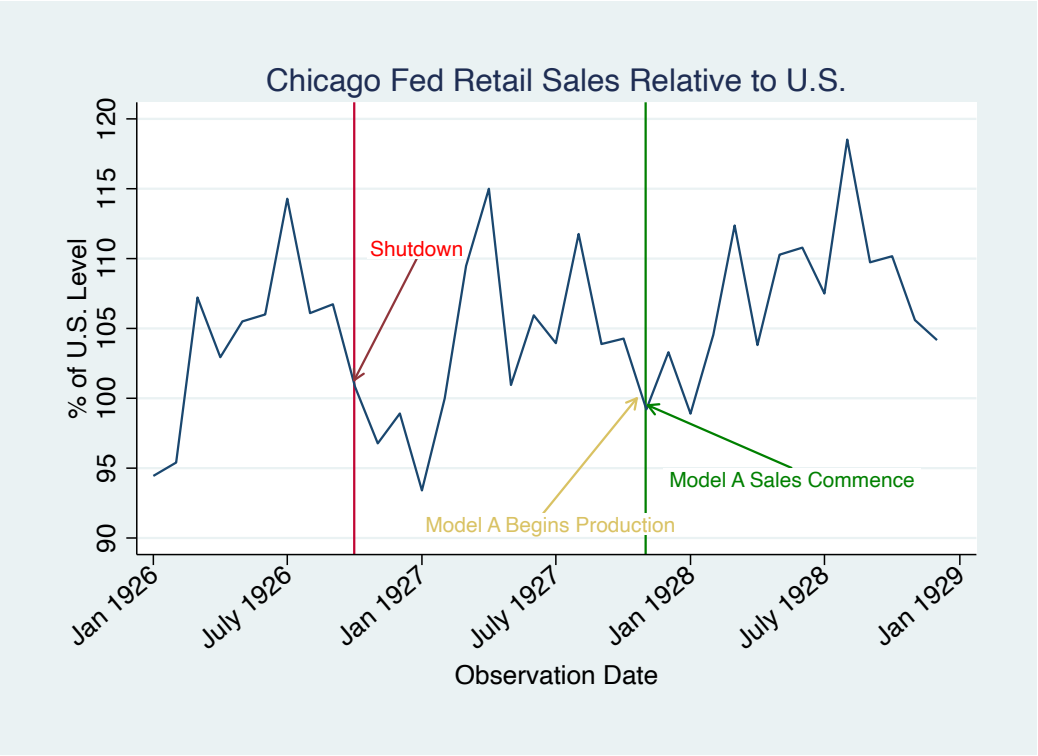


retail sales data for individual Fed districts and for the nation as a whole.[4] Retail sales tend to be correlated with the business cycle, and have been used as a proxy for overall economic activity in the literature (Fishback et al., 2005). Michigan was in the Chicago district, as can be seen in 1. If the Ford shutdown had a significant impact, we should see a larger decline retail sales in Chicago than in other districts. We use the ratio of Retail Sales in the Chicago Fed district to the overall USA to see if the Retail Sales in the Chicago Fed District fell faster than those in the nation as a whole, as can be seen in Figure 2. We do see that Chicago Fed retail sales fall in the two months immediately after the shutdown began, but then see a rebound larger than the initial decline, such that retail sales in this Fed district at then higher than those in the rest of the USA by mid 1927.

The automobile industry also had backward linkages to other industrial sectors like glass, rubber, and steel. While there were other firms producing these goods

[4]See Park and Richardson (2012) for a more involved description of the data.

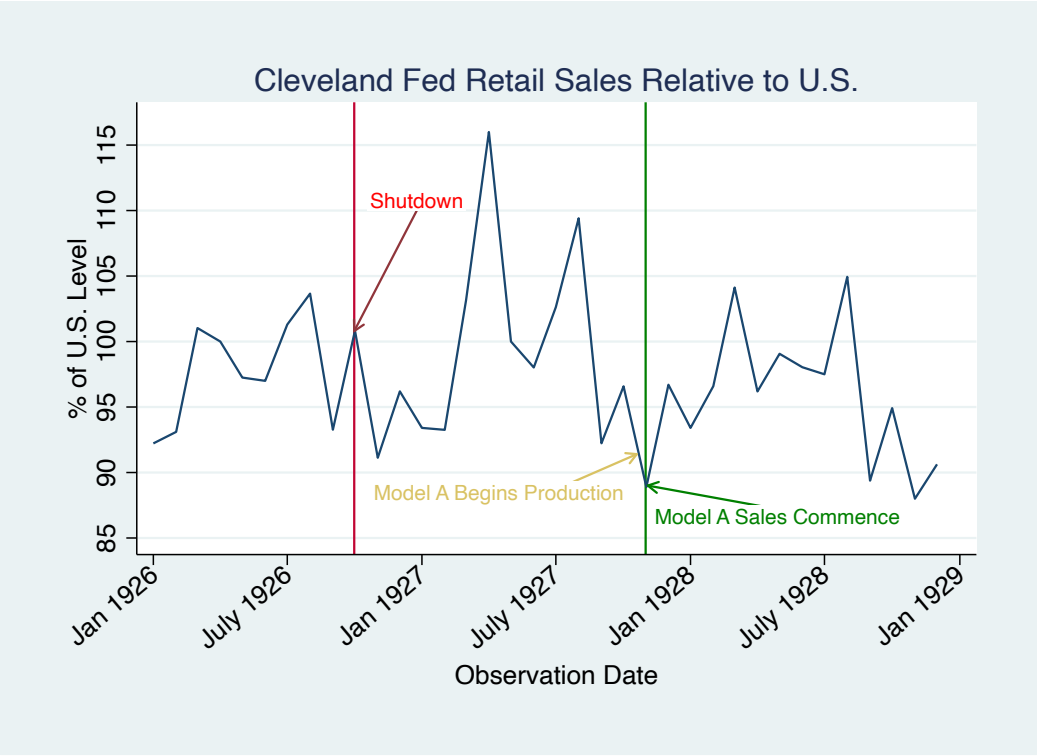
Figure 2: Chicago Fed Retail Sales Relative to US Retail Sales



in the Chicago district, the iconic producers of steel (Pittsburgh), rubber (Akron, OH), and of glass (Toledo, OH) were located in the Cleveland district, which immediately bordered Michigan as well. As the Ford shutdown could affect the Cleveland district, we also consider the Cleveland Fed Retail sales relative to US retail sales in Figure 3. Again, there is some weakness initially, but then Cleveland also sees a rebound relative to the rest of the country which is larger than the initial decline.

However, one might think that industry as a whole might be experiencing some shock independently of the Ford Shutdown, so we also consider the behavior of retail sales in the Boston Fed District. This district, covering New England, has a significant industrial base, but one which is largely unconnected to the Midwestern auto industry. As can be seen in Figure 4, the Boston district begins the shutdown

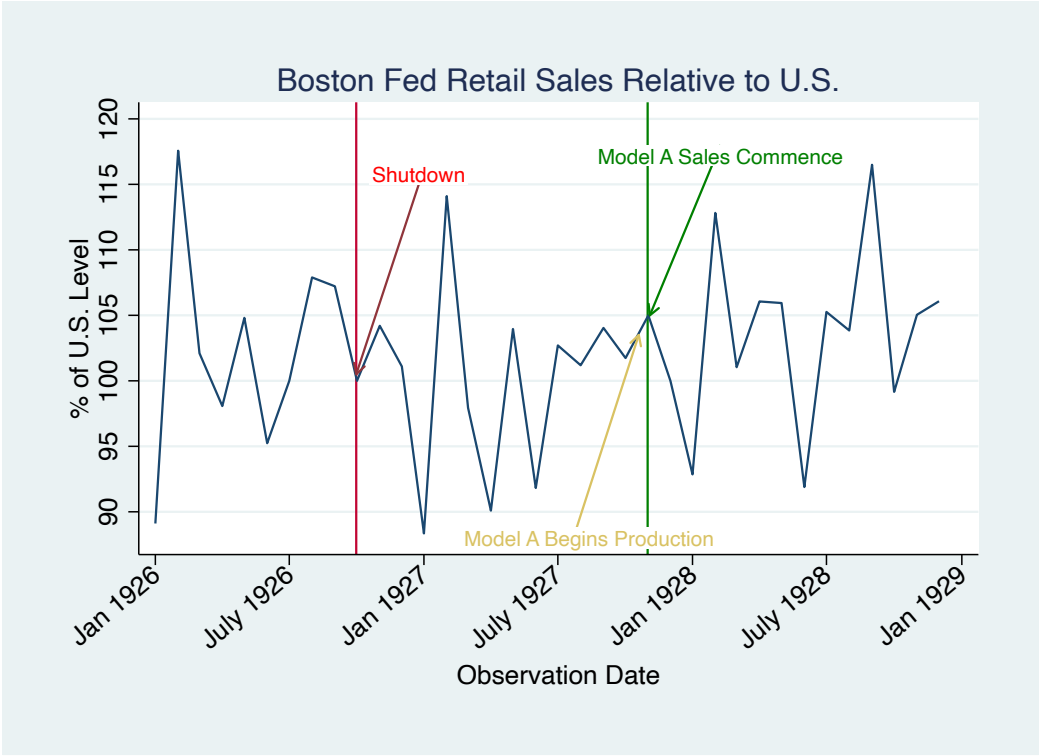
Figure 3: Cleveland Fed Retail Sales Relative to US Retail Sales



at rough parity with the country as a whole, and then sees strong fluctuations but ends the period at rough parity as well.

We also run Bai and Perron (2003) structural break tests for retail sales in the three Federal Reserve Districts (Chicago, Cleveland, and Boston) to see if a neutral econometric test will detect dates relevant to the shutdown. As above, we consider both the full period, here 1919-1939, and the 1923-1929 period as well. No structural breaks were observed in the 1923-1929 period for any of the three districts, though some were identified for the whole period. For the Chicago Fed district, we observe structural breaks for February 1928 and December 1933, both occurring well after the events of the shutdown. For the Cleveland Fed, the structural break identified was for August 1931, and for the Boston Fed, the breakpoint identified was for January 1934. These are also well after the shutdown.

Figure 4: Boston Fed Retail Sales Relative to US Retail Sales



Overall, there is little evidence the retail sales were persistently negative in the areas affected by the shutdown. This is despite anecdotal evidence that the shutdown caused major unemployment among Ford workers. This is perhaps unsurprising, as the unemployment from the Ford shutdown is visible, while those workers hired by Ford competitors, ramping up production to gain market share at Ford's expense, are less visible.[5]

6 Conclusion

Despite the certainty that Henry Ford's shutdown was important for the 1926-1927 recession, we find little evidence that the Ford shutdown mattered in the

[5]Here, Bastiat's "What is Seen and What is Not Seen" comes to mind (Bastiat, 2010).

aggregate. Even for the extreme case of such a large corporation undergoing a total shutdown of new production, market forces mitigated the large microeconomic shock so effectively that the macroeconomic effect was small. Other firms, particularly GM, ramped up production and took away market share from Ford, with overall automobiles sales rising from 1926 to 1927. This competitive effect was strongest for automobile models in the lower end of the market, consistent with what would be expected from this competitive effect. Econometrically identified structural breaks do not follow important dates for the Ford shutdown and reopening. Retail sales in the Chicago District, containing Michigan, do not see large relative declines relative to other similar districts or the country as a whole, which one might expect if a granular, Michigan-specific shock, was an important factor in the recession of 1926-1927. In this case of a large shock to one of the largest, most important firms in the United States at the time, we find little support for a granular explanation for economic fluctuations.

Nor did Henry Ford learn his lesson. After introducing the Model A in 1927, he again refused to make new model years, as other automakers did, incorporating the latest features in Ford vehicles. In repeating the same mistakes as Ford had with the Model T, he allowed the rise of another competitor, in the form of the Chrysler corporation and their groundbreaking Plymouth. In 1932, in the midst of a disastrous sales environment during the Great Depression, and the rise of Chrysler as the other member of the Big 3 automakers, Ford closed down the lines again for 5 months at the River Rouge plant to retool for the brand new Ford V-8. During this shutdown, Ford lost about a thousand dealerships while Chrysler gained about the same number (Sward, 1968, 205-6). While these shocks to Ford sales had little impact on the American business cycle, Ford's market share would never recover the heights it had reached when the Model T was at its zenith. The Ford corporation had lost its dominant market position to its competitors forever.

References

Acemoglu, Daron, Asuman Ozdaglar, and Alireza Tahbaz-Salehi, "Microeconomic origins of macroeconomic tail risks," *American Economic Review*, 2017, *107* (1), 54–108.

_ , Vasco M Carvalho, Asuman Ozdaglar, and Alireza Tahbaz-Salehi, "The network origins of aggregate fluctuations," *Econometrica*, 2012, *80* (5), 1977–2016.

Ahamed, Liaquat, *Lords of finance: The bankers who broke the world*, Random House, 2009.

Atalay, Enghin, Ali Hortacsu, James Roberts, and Chad Syverson, "Network structure of production," *Proceedings of the National Academy of Sciences*, 2011, *108* (13), 5199–5202.

Bai, Jushan and Pierre Perron, "Computation and analysis of multiple structural change models," *Journal of applied econometrics*, 2003, *18* (1), 1–22.

Barrot, Jean-Noël and Julien Sauvagnat, "Input specificity and the propagation of idiosyncratic shocks in production networks," *The Quarterly Journal of Economics*, 2016, *131* (3), 1543–1592.

Bastiat, M Frederic, *That which is seen and that which is not seen*, North Charleston, SC: Createspace Independent Publishing Platform, October 2010.

Brinkley, Douglas and D Brinkley, *Wheels for the world: Henry Ford, his company, and a century of progress, 1903-2003*, Viking New York, 2003.

Eichengreen, Barry J, *Golden fetters: the gold standard and the Great Depression, 1919-1939*, NBER series on long-term factors in economic development, 1996.

Fishback, Price V, William C Horrace, and Shawn Kantor, "Did New Deal grant programs stimulate local economies? A study of Federal grants and retail sales during the Great Depression," *The Journal of Economic History*, 2005, *65* (1), 36–71.

Gabaix, Xavier, "The granular origins of aggregate fluctuations," *Econometrica*, 2011, *79* (3), 733–772.

Heasley, Jerry, *The Production Figure Book for US Cars*, Motorbooks International, 1977.

Kimes, Beverly Rae and Henry A Clark, *Standard catalog of American cars, 1805-1942*, Krause Publications, 1989.

Kindleberger, Charles Poor et al., *The world in depression, 1929-1939*, Vol. 4, Univ of California Press, 1986.

Kuhn, Arthur J, *GM passes Ford, 1918-1938: designing the General Motors performance-control system*, Penn State University Press, 1986.

McMillin, W Douglas and Randall E Parker, "An empirical analysis of oil price shocks in the interwar period," *Economic Inquiry*, 1994, *32* (3), 486–497.

Nevins, Allan and Frank Ernest Hill, *Ford, Expansion and Challenge, 1915-1933*, Vol. 1, Scribner, 1957.

Park, Haelim and Gary Richardson, "Retail trade by federal reserve district, 1919 to 1939: A statistical history," in "Research in Economic History," Emerald Group Publishing Limited, 2012.

Robertson, DH, "A Narrative of the General Strike of 1926," *Economic Journal*, 1926, pp. 375–393.

Sward, Keith, *The Legend of Henry Ford*, Vol. 129, New York: Atheneum, 1968 [c1948], 1968.

7 Figures and Tables

Figure 5: Chevrolet, Ford, and Chrysler Company Sales

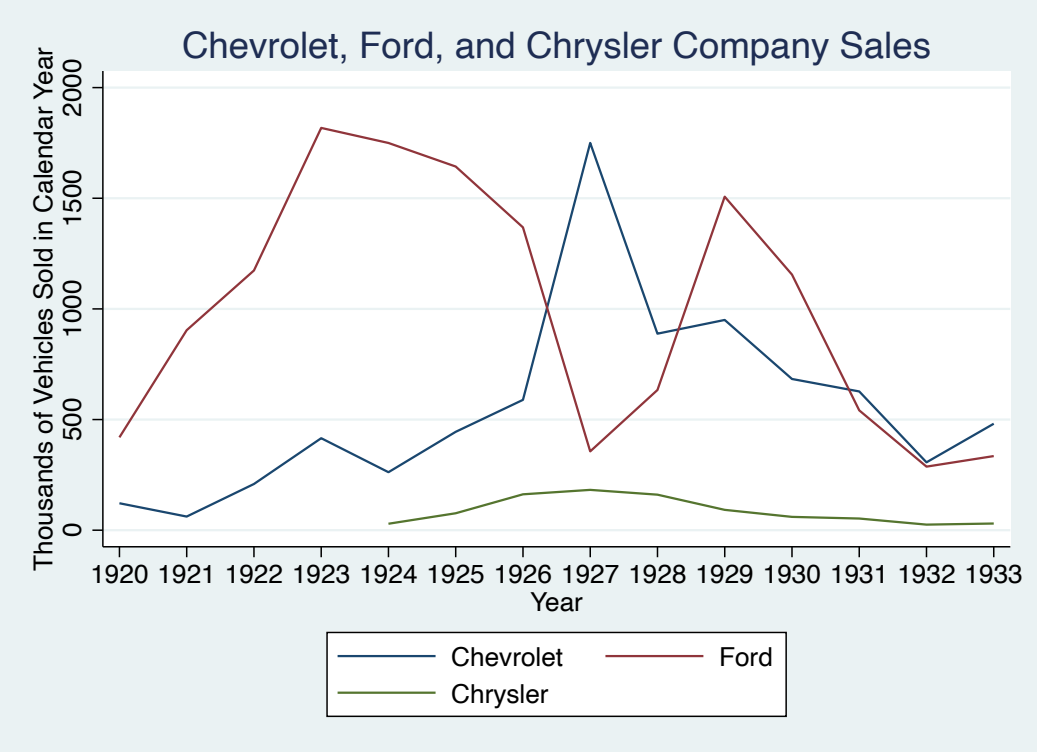


Figure 6: Revenue Change vs. Market Segment

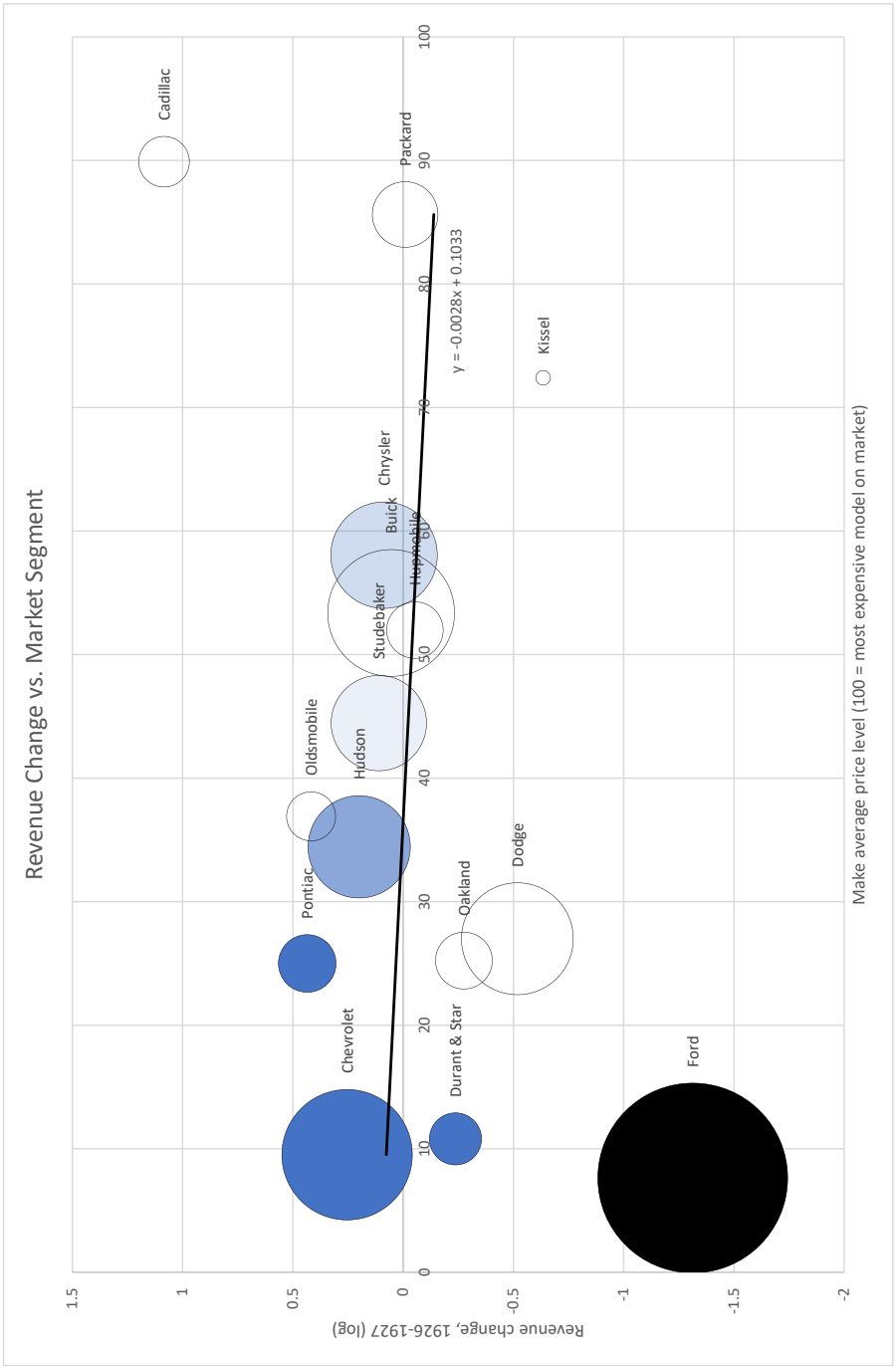
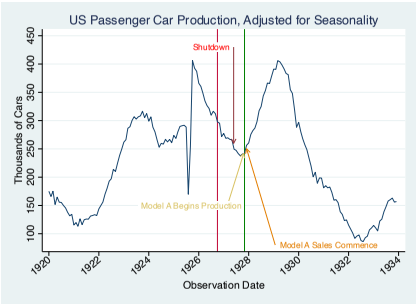
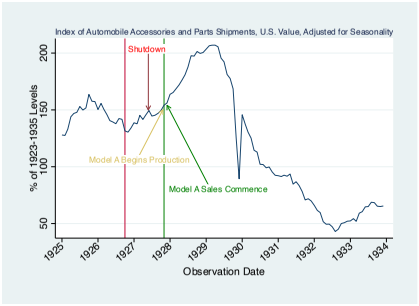


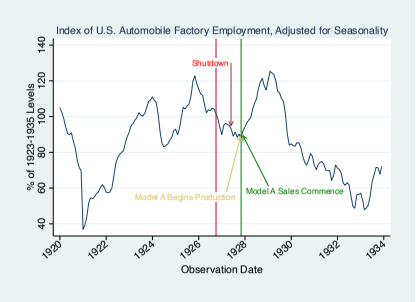
Figure 7: Set of figures I



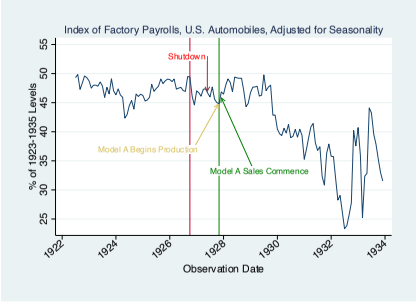
(a) US Passenger Car Production



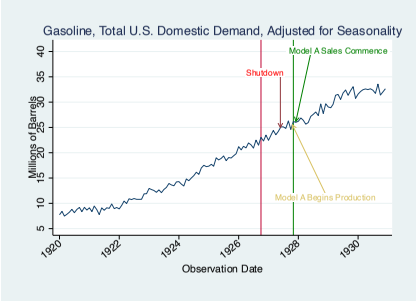
(b) Automobile Parts Production



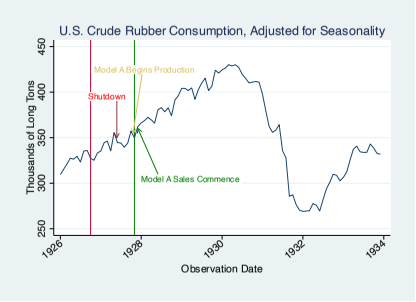
(c) Index of U.S. Automobile Factory Employment



(d) Index of Factory Payrolls



(e) Gasoline, Total U.S. Domestic Demand

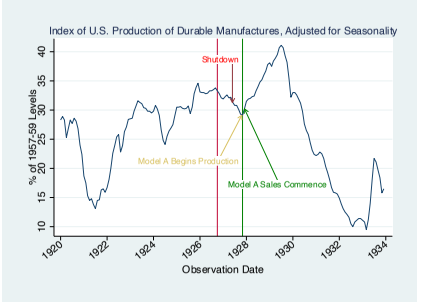


(f) US Crude Rubber Consumption

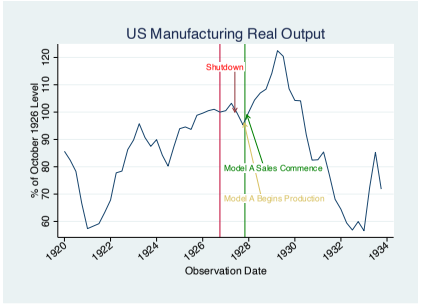
Figure 8: Set of figures II

(a) US New Passenger Car Registrations

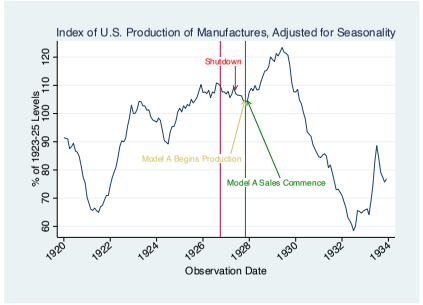
(b) Industrial Production, Manufacturing



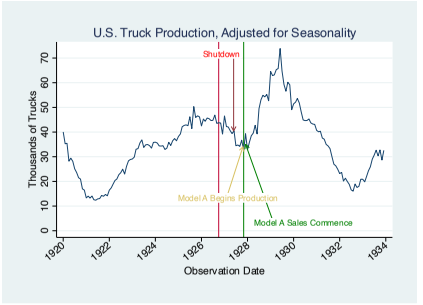
(c) U.S. Durable Manufacturing



(d) Real Manufacturing Output

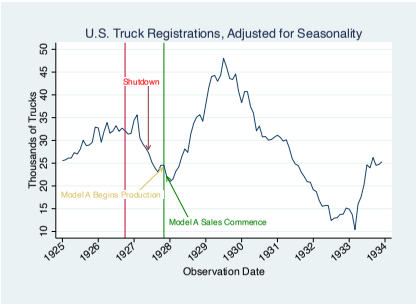


(e) Manufacturing Production

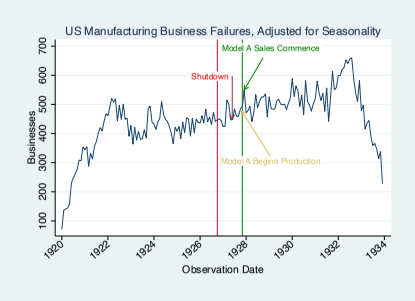


(f) Truck Production

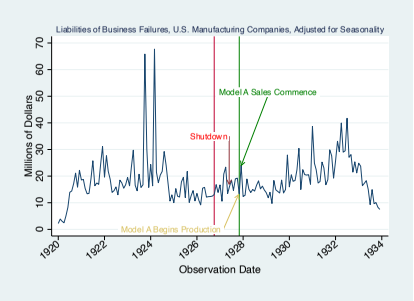
Figure 9: Set of figures III



(a) Truck Registrations



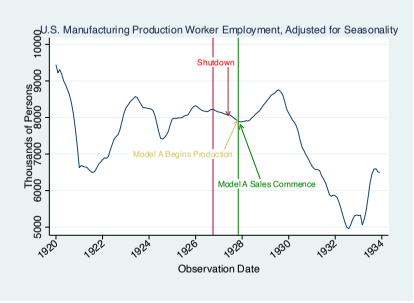
(b) Manufacturing Business Failures



(c) Liabilities of Manufacturing Failures

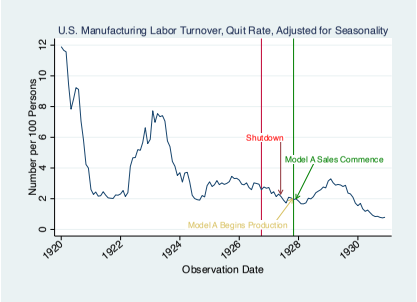
(d) Manufacturing Production Worker Labor Productivity

(e) Weekly Earnings in Manufacturing



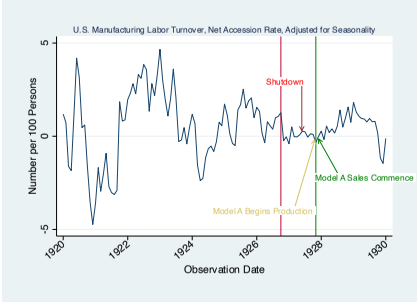
(f) Manufacturing Worker Employment

Figure 10: Set of figures IV

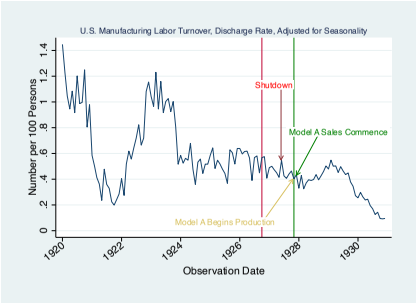


(a) Quit Rate, Manufacturing

(b) Gross Hire Rate, Manufacturing

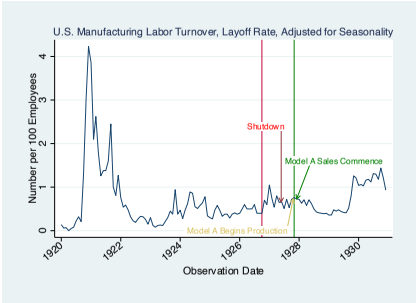


(c) Net Hire Rate, Manufacturing



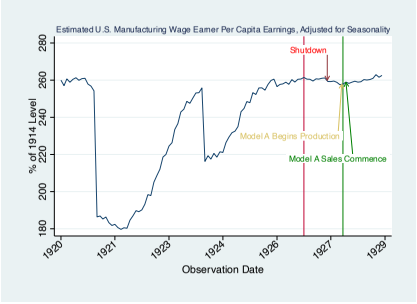
(d) Fire Rate, Manufacturing

(e) Total Separation Rate, Manufacturing



(f) Layoff Rate, Manufacturing

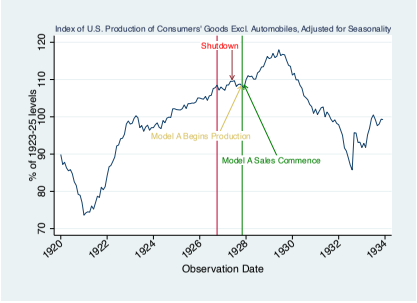
Figure 11: Set of figures V



(a) Manufacturing Earnings per capita

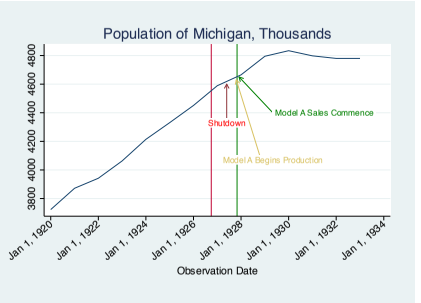
(b) Department Store Sales

(c) Retail Trade Index



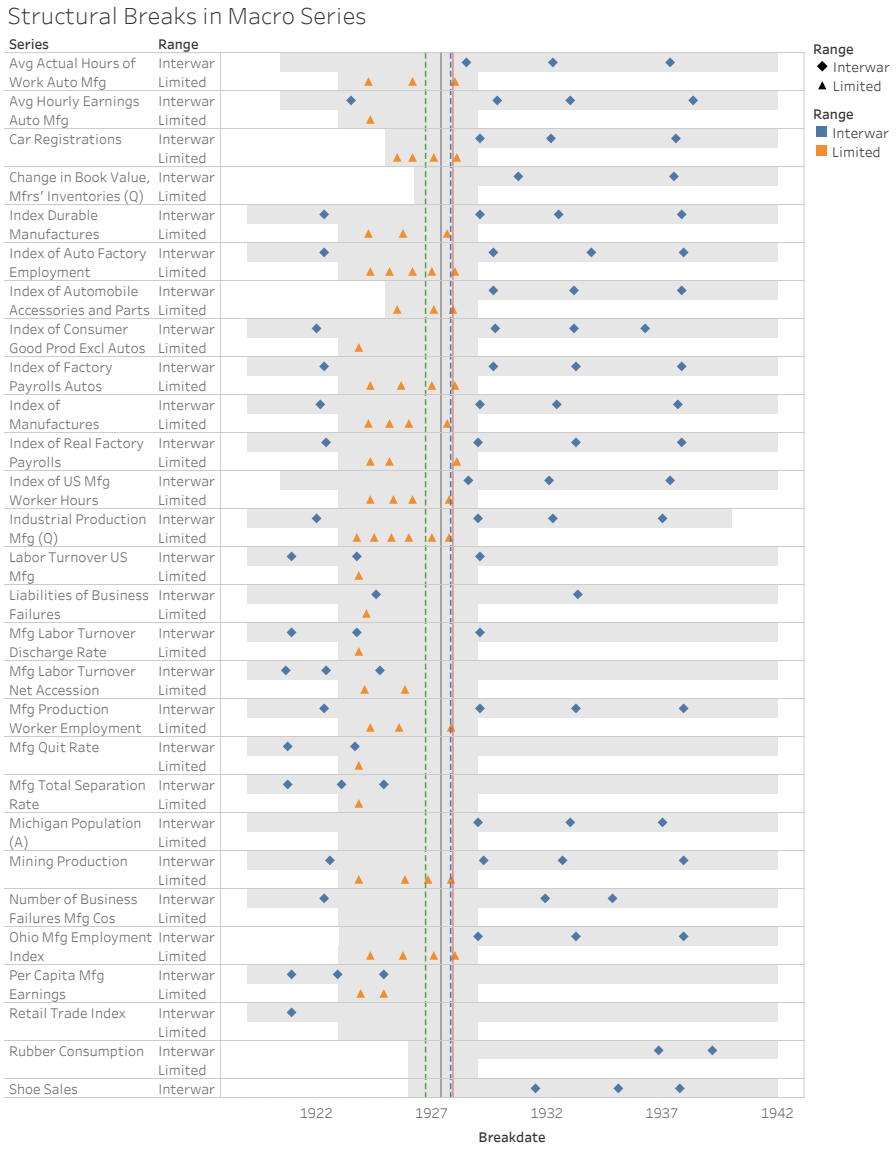
(d) Consumer Goods Production ex-Autos

(e) Shoe Sales



(f) Population of Michigan

Figure 12: All Breakdates



Breakdate for each Range broken down by Series. Color shows details about Range. Shape shows details about Range. Details are shown for Startdate and Enddate.

Table 1: Structural Break Tests

		Key Events					
	Recession	Mod T End	Mod A Prod	Recovery	Mod A Sale		
		1926-10-01	1927-05-26	1927-10-20	1927-11-01	1927-12-02	
Series	Range			Breakdates			
Industrial Production Mfg (Q)	Interwar	1922-01-01	1929-01-01	1932-04-01	1937-01-01		
	Limited	1923-10-01	1924-07-01	1925-04-01	1926-01-01	1927-01-01	1927-10-01
Mining Production	Interwar	1922-08-01	1929-04-01	1932-09-01	1937-12-01		
	Limited	1923-11-01	1925-11-01	1926-11-01	1927-11-01		
US Department Store Sales	Interwar	1923-02-01	1929-10-01	1933-03-01	1938-02-01		
	Limited	1924-09-01					
Mfg Production Worker Employment	Interwar	1922-05-01	1929-02-01	1933-04-01	1937-12-01		
	Limited	1924-05-01	1925-08-01	1927-11-01			
US Mfg Output per Worker Hour	Interwar	1921-12-01	1931-09-01				
	Limited	N/A					
US Passenger Car Production	Interwar	1923-01-01	1929-01-01	1932-11-01	1937-08-01		
	Limited	1925-02-01	1926-02-01	1927-02-01	1928-01-01		
US Gasoline Demand	Interwar	1924-03-01					
	Limited	N/A					
Index Durable Manufactures	Interwar	1922-05-01	1929-02-01	1932-07-01	1937-11-01		
	Limited	1924-04-01	1925-10-01	1927-09-01			
Steel Production	Interwar	1922-02-01	1929-01-01	1932-08-01	1936-03-01		
	Limited	1924-04-01	1925-03-01	1926-03-01	1927-01-01	1927-12-01	

US Truck Production	Interwar	1923-02-01	1929-01-01	1933-03-01	1937-08-01
	Limited	1925-02-01	1928-02-01		
Truck Registrations	Interwar	1929-02-01	1933-03-01	1937-09-01	
	Limited	1926-02-01	1928-03-01		
Rubber Consumption	Interwar	1936-11-01	1939-03-01		
	Limited	N/A			
Retail Trade Index	Interwar	1920-12-01			
	Limited	N/A			
Index of Factory Payrolls	Interwar	1928-07-01	1932-04-01	1937-05-01	
	Limited	1924-04-01	1926-03-01	1928-01-01	
Avg Hourly Earnings Auto Mfg	Interwar	1923-07-01	1929-11-01	1933-01-01	1938-05-01
	Limited	1924-05-01			
Mfg Quit Rate	Interwar	1920-10-01	1923-09-01		
	Limited	1923-11-01			
US Mfg Layoff Rate	Interwar	1920-10-01	1922-07-01	1928-07-01	
	Limited	1924-11-01	1926-12-01		
Labor Turnover US Mfg	Interwar	1920-12-01	1923-10-01	1929-02-01	
	Limited	1923-11-01			
Mfg Labor Turnover Discharge Rate	Interwar	1920-12-01	1923-10-01	1929-02-01	
	Limited	1923-11-01			
Mfg Total Separation Rate	Interwar	1920-10-01	1923-02-01	1924-12-01	
	Limited	1923-11-01			
US Mfg Gross Accession Rate	Interwar	1920-09-01	1923-07-01		

	Limited	1924-05-01	1925-10-01	1926-10-01		
Mfg Labor Turnover Net Accession	Interwar	1920-09-01	1922-06-01	1924-10-01		
	Limited	1924-02-01	1925-11-01			
Index of US Mfg Worker Hours	Interwar	1928-08-01	1932-02-01	1937-05-01		
	Limited	1924-05-01	1925-05-01	1926-03-01	1927-10-01	
No of Business Failures Mfg Companies	Interwar	1922-05-01	1931-12-01	1934-11-01		
	Limited	N/A				
Liabilities of Business Failures	Interwar	1924-08-01	1933-05-01			
	Limited	1924-03-01				
Index of Manufactures	Interwar	1922-03-01	1929-02-01	1932-06-01	1937-09-01	
	Limited	1924-04-01	1925-03-01	1926-01-01	1927-09-01	
Index of CG Production Excl Autos	Interwar	1922-01-01	1929-10-01	1933-03-01	1936-04-01	
	Limited	1923-11-01				
Car Registrations	Interwar	1929-02-01	1932-03-01	1937-08-01		
	Limited	1925-07-01	1926-03-01	1927-02-01	1928-02-01	
Index of Auto Accessories and Parts	Interwar	1929-09-01	1933-03-01	1937-11-01		
	Limited	1925-07-01	1927-02-01	1927-12-01		
Shoe Sales	Interwar	1931-07-01	1935-02-01	1937-10-01		
	Limited	N/A				
Per Capita Mfg Earnings	Interwar	1920-12-01	1922-12-01	1924-12-01		
	Limited	1923-12-01	1924-12-01			
Index of Auto Factory Employment	Interwar	1922-05-01	1929-09-01	1933-12-01	1937-12-01	
	Limited	1924-05-01	1925-03-01	1926-03-01	1927-01-01	1928-01-01

Index of Factory Payrolls	Interwar	1922-05-01	1929-09-01	1933-04-01	1937-11-01
	Limited	1924-05-01	1925-09-01	1927-01-01	1928-01-01
Index of Real Factory Payrolls	Interwar	1922-06-01	1929-01-01	1933-04-01	1937-11-01
	Limited	1924-05-01	1925-03-01	1928-02-01	
US Mfg Weekly Earnings	Interwar	1923-01-01	1929-10-01	1933-04-01	1937-11-01
	Limited	1924-05-01	1925-03-01		
Ohio Mfg Employment Index	Interwar	1929-01-01	1933-04-01	1937-12-01	
	Limited	1924-05-01	1925-10-01	1927-02-01	1928-01-01
Delta Book Value of Mfrs' Inventories (Q)	Interwar	1930-10-01	1937-07-01		
	Limited	No data			
Michigan Population (A)	Interwar	1929-01-01	1933-01-01	1937-01-01	
	Limited	No data			

Table 2: Structural Break Test II

		Key Events					
	Recession	Mod T End	Mod A Prod	Recovery	Mod A Sale		
		1926-10-01	1927-05-26	1927-10-20	1927-11-01	1927-12-02	
Series	Range	Breakdates					
Industrial Production Mfg (Q)	Interwar	1922-01-01	1929-01-01	1932-04-01	1937-01-01		
	Limited	1923-10-01	1924-07-01	1925-04-01	1926-01-01	1927-01-01	1927-10-01
Mining Production	Interwar	1922-08-01	1929-04-01	1932-09-01	1937-12-01		
	Limited	1923-11-01	1925-11-01	1926-11-01	1927-11-01		
US Department Store Sales	Interwar	1923-02-01	1929-10-01	1933-03-01	1938-02-01		
	Limited	1924-09-01					
Mfg Production Worker Employment	Interwar	1922-05-01	1929-02-01	1933-04-01	1937-12-01		
	Limited	1924-05-01	1925-08-01	1927-11-01			
US Mfg Output per Worker Hour	Interwar	1921-12-01	1931-09-01				
	Limited	N/A					
US Passenger Car Production	Interwar	1923-01-01	1929-01-01	1932-11-01	1937-08-01		
	Limited	1925-02-01	1926-02-01	1927-02-01	1928-01-01		
US Gasoline Demand	Interwar	1924-03-01					
	Limited	N/A					
Index Durable Manufactures	Interwar	1922-05-01	1929-02-01	1932-07-01	1937-11-01		
	Limited	1924-04-01	1925-10-01	1927-09-01			
Steel Production	Interwar	1922-02-01	1929-01-01	1932-08-01	1936-03-01		
	Limited	1924-04-01	1925-03-01	1926-03-01	1927-01-01	1927-12-01	

US Truck Production	Interwar	1923-02-01	1929-01-01	1933-03-01	1937-08-01
	Limited	1925-02-01	1928-02-01		
Truck Registrations	Interwar	1929-02-01	1933-03-01	1937-09-01	
	Limited	1926-02-01	1928-03-01		
Rubber Consumption	Interwar	1936-11-01	1939-03-01		
	Limited	N/A			
Retail Trade Index	Interwar	1920-12-01			
	Limited	N/A			
Index of Factory Payrolls	Interwar	1928-07-01	1932-04-01	1937-05-01	
	Limited	1924-04-01	1926-03-01	1928-01-01	
Avg Hourly Earnings Auto Mfg	Interwar	1923-07-01	1929-11-01	1933-01-01	1938-05-01
	Limited	1924-05-01			
Mfg Quit Rate	Interwar	1920-10-01	1923-09-01		
	Limited	1923-11-01			
US Mfg Layoff Rate	Interwar	1920-10-01	1922-07-01	1928-07-01	
	Limited	1924-11-01	1926-12-01		
Labor Turnover US Mfg	Interwar	1920-12-01	1923-10-01	1929-02-01	
	Limited	1923-11-01			
Mfg Labor Turnover Discharge Rate	Interwar	1920-12-01	1923-10-01	1929-02-01	
	Limited	1923-11-01			
Mfg Total Separation Rate	Interwar	1920-10-01	1923-02-01	1924-12-01	
	Limited	1923-11-01			
US Mfg Gross Accession Rate	Interwar	1920-09-01	1923-07-01		

	Limited	1924-05-01	1925-10-01	1926-10-01		
Mfg Labor Turnover Net Accession	Interwar	1920-09-01	1922-06-01	1924-10-01		
	Limited	1924-02-01	1925-11-01			
Index of US Mfg Worker Hours	Interwar	1928-08-01	1932-02-01	1937-05-01		
	Limited	1924-05-01	1925-05-01	1926-03-01	1927-10-01	
No of Business Failures Mfg Companies	Interwar	1922-05-01	1931-12-01	1934-11-01		
	Limited	N/A				
Liabilities of Business Failures	Interwar	1924-08-01	1933-05-01			
	Limited	1924-03-01				
Index of Manufactures	Interwar	1922-03-01	1929-02-01	1932-06-01	1937-09-01	
	Limited	1924-04-01	1925-03-01	1926-01-01	1927-09-01	
Index of CG Production Excl Autos	Interwar	1922-01-01	1929-10-01	1933-03-01	1936-04-01	
	Limited	1923-11-01				
Car Registrations	Interwar	1929-02-01	1932-03-01	1937-08-01		
	Limited	1925-07-01	1926-03-01	1927-02-01	1928-02-01	
Index of Auto Accessories and Parts	Interwar	1929-09-01	1933-03-01	1937-11-01		
	Limited	1925-07-01	1927-02-01	1927-12-01		
Shoe Sales	Interwar	1931-07-01	1935-02-01	1937-10-01		
	Limited	N/A				
Per Capita Mfg Earnings	Interwar	1920-12-01	1922-12-01	1924-12-01		
	Limited	1923-12-01	1924-12-01			
Index of Auto Factory Employment	Interwar	1922-05-01	1929-09-01	1933-12-01	1937-12-01	
	Limited	1924-05-01	1925-03-01	1926-03-01	1927-01-01	1928-01-01

Index of Factory Payrolls	Interwar	1922-05-01	1929-09-01	1933-04-01	1937-11-01
	Limited	1924-05-01	1925-09-01	1927-01-01	1928-01-01
Index of Real Factory Payrolls	Interwar	1922-06-01	1929-01-01	1933-04-01	1937-11-01
	Limited	1924-05-01	1925-03-01	1928-02-01	
US Mfg Weekly Earnings	Interwar	1923-01-01	1929-10-01	1933-04-01	1937-11-01
	Limited	1924-05-01	1925-03-01		
Ohio Mfg Employment Index	Interwar	1929-01-01	1933-04-01	1937-12-01	
	Limited	1924-05-01	1925-10-01	1927-02-01	1928-01-01
Delta Book Value of Mfrs' Inventories (Q)	Interwar	1930-10-01	1937-07-01		
	Limited	No data			
Michigan Population (A)	Interwar	1929-01-01	1933-01-01	1937-01-01	
	Limited	No data			