

Center for Applied Demography & Survey Research

University of Delaware

The Impact of Corporate Downsizing on the Economy of the State of Delaware

By

Omar J Borla

June 2019

The University of Delaware does not discriminate against any person on the basis of race, color, national origin, sex, gender identity or expression, sexual orientation, genetic information, marital status, disability, religion, age, veteran status or any other characteristic protected by applicable law in its employment, educational programs and activities, admissions policies, and scholarship and loan programs as required by Title IX of the Educational Amendments of 1972, the Americans with Disabilities Act of 1990, Section 504 of the Rehabilitation Act of 1973, Title VII of the Civil Rights Act of 1964, and other applicable statutes and University policies. The University of Delaware also prohibits unlawful harassment, including sexual harassment and sexual violence. For inquiries or complaints related to non-discrimination policies, please contact: Director, Institutional Equity & Title IX Coordinator 305 Hullen Hall, Newark, DE 19716 - 302-831-8063

Acknowledgments

We want to thank Dr. George Sharpley, Chief of the Office of Occupational and Labor Market Information of the Department of Labor for sharing his insights about the industries and characteristics of the labor force of Delaware and for furnishing us with staffing pattern estimations for all sectors within the State of Delaware.

TABLE OF CONTENTS

Acknowledgments.....	3
TABLE OF CONTENTS.....	4
INDEX OF TABLES	5
INDEX OF FIGURES	7
Executive Summary	8
Introduction and Scope of Report	14
Corporate Downsizing	16
What is Corporate Downsizing and What are the Reasons for it?.....	16
The Primary or Direct Employment Impact of Corporate Downsizing.....	19
The Situation in Delaware	20
Employment Changes Due to Corporate Downsizing vs. Due to the Business Cycle.	20
Occupation and Income of the Corporate Downsized Labor.....	31
Corporate Downsizing and the Local Real Estate Market.....	43
The Economic Impact of Corporate Downsizing	53
Conclusion	58
Appendix A.....	60
Appendix B	67
The REMI PI+ Model	67
Additional Economic Impact Results	72

INDEX OF TABLES

Table 1 – Chow Test for Stability of Parameters in the U.S. – DE Employment Regression.....	23
Table 2 – List of Downsizing Industries During the 2005 to 2018 Period.	24
Table 3 – Correlation Matrix Between Relevant Downsizing Sectors in Delaware and the U.S.....	28
Table 4 – Estimated Employment and Wages Lost Due to Corporate Downsizing.	29
Table 5 – Chemical Manufacturing – NAICS 325	33
Table 6 – Plastic and Rubber Products Manufacturing – NAICS 326.....	34
Table 7 – Merchant Wholesalers, Nondurable Goods – NAICS 424	35
Table 8 – Credit Intermediation and Related Activities – NAICS 522	38
Table 9 – Securities, Commodity Contracts, and Other Financial Investments – NAICS 523	39
Table 10 – Professional, Scientific, and Technical Services – NAICS 541	40
Table 11 – Management of Companies and Enterprises – NAICS 551.....	41
Table 12 – Employment Losses Based on Wages Per Capita per Year.....	42
Table 13 – Number of Real Estate Transactions for Zip Codes 19807, 19707, and NCC	45
Table 14 – Regression Analysis for All Real Estate Sales in NCC	48
Table 15 – Regression Analysis for All Real Estate Sales in Zip Code 19807	49

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 16 – Regression Analysis for All Real Estate Sales in Zip Code 19707	50
Table 17 – Estimated Personal Wealth Losses in Real Estate Transaction 2007 – 2018	52
Table 18 – Summary of the Economic Impact of Corporate Downsizing on NCC	54
Table 19 – Summary of the Economic Impact of Corporate Downsizing on Delaware	54
Table 20 – Economic Impact of Corporate Downsizing on Employment by Industry in NCC	55
Table 21 – Economic Impact of Corporate Downsizing on Employment by Industry in Delaware	55
Table 22 – Economic Impact of Corporate Downsizing on Occupations in NCC.	56
Table 23 – Economic Impact of Corporate Downsizing on Occupations in Delaware.	57
Table 24 – Occupations in Chemical Manufacturing – NAICS 325	60
Table 25 – Occupations in Plastics and Rubber Products Manufacturing – NAICS 326	61
Table 26 – Occupations in Merchant Wholesalers, Non-Durable Goods – NAICS 424.....	62
Table 27 – Occupations in Credit Intermediation and Related Activities – NAICS 522	63
Table 28 – Occupations in Securities, and Other Financial Investments – NAICS 523.....	64
Table 29 – Occupations in Professional, Scientific, and Technical Services - NAICS 541	65
Table 30 – Occupations in Management of Companies and Enterprises – NAICS 551	66
Table 31 – Economic Impact of Corporate Downsizing on Output in New Castle County.	72
Table 32 – Economic Impact of Corporate Downsizing on Output in the State of Delaware.....	72
Table 33 – Economic Impact of Corporate Downsizing on Income and Earnings – NCC.	73
Table 34 – Economic Impact of Corporate Downsizing on Income and Earnings – Delaware.	73

INDEX OF FIGURES

Figure 1 – Evolution of Total Employment in the U.S. and Delaware.....	21
Figure 2 – Evolution of Total Employment in the U.S. and Delaware (12-month MA).....	22
Figure 3 – Employment Changes Due to Downsizing in NAICS 325 in the U.S. and Delaware	25
Figure 4 – Employment Changes Due to Downsizing in NAICS 424 in the U.S. and Delaware	25
Figure 5 – Employment Changes Due to Downsizing in NAICS 522 in the U.S. and Delaware	26
Figure 6 – Employment Changes Due to Downsizing in NAICS 523 in the U.S. and Delaware	27
Figure 7 – Employment Changes Due to Downsizing in NAICS 541 in the U.S. and Delaware	27
Figure 8 – Employment Changes Due to Downsizing in NAICS 551 in the U.S. and Delaware	28
Figure 9 – Illustration of Block Interactions Within the REMI PI+ Model	69
Figure 10 – How REMI Forecast the Effect of a Policy.....	71

Executive Summary

The Center for Applied Demography & Survey Research at the University of Delaware conducted this study to explore the economic impact of Corporate Downsizing on the State of Delaware. The Delaware Department of Transportation funded this report. Nevertheless, the author is solely responsible for its design and execution.

The research draws attention to the impact of Corporate Downsizing beyond the downsizing corporation itself. The results show that downsizing affects not only the targets of the termination of employment but also their families, the local economy and the schools, commuting patterns, as well as a variety of components of the local community, the County, the State of Delaware, and surrounding States.

Corporate Downsizing is the termination of numerous employees simultaneously and permanently, and utterly unrelated to any conduct of the part of the employees. Corporations downsize as a way to maintain levels of profitability, and it is the most common recourse when the firm faces increasing competition, decreasing market share, product obsolescence due to technological changes, or when merging with or being acquired by other corporations. Once started, the downsizing process negatively affects not only those employees that are terminated but also the “survivors” as they are not sure who may be next. Said survivors often take on the responsibilities of those who leave in addition to their normal activities, which reduces productivity, creativity, and efficiency.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

The analysis of employment affected by Corporate Downsizing considers several factors: First, there is an initial wave of dismissals, which the corporation announces officially. Second, after the first round, the corporation continues downsizing through restructuring, consolidation of operations, closing branches, office buildings, plants, and other facilities that it no longer considers necessary. Third, a process of post-downsizing attrition driven by lower morale among the “survivors” results in many of them seeking employment elsewhere. Consequently, the reduction in the number of employees is a process that continues for a sizable period. Importantly, the dismissals are more detrimental to highly-skilled than lower-skilled employees. Given the size of the Delaware economy, a highly-skilled worker has fewer probabilities of finding a job within the State than the less skilled.

We analyzed the evolution of employment in the following industries:

NAICS	Description
325	Chemical manufacturing
326	Plastics and rubber products manufacturing
424	Merchant wholesalers, nondurable goods
425	Electronic markets and agents and brokers
481	Air transportation
493	Warehousing and storage
522	Credit intermediation and related activities
523	Securities, commodity contracts, investments
541	Professional and technical services
551	Management of companies and enterprises
711	Performing arts and spectator sports
713	Amusements, gambling, and recreation
721	Accommodation

The last three industries identified with NAICS 711, 713, and 721 are loosely related to a major corporation within the NAICS 551, “Management of companies and enterprises.” Also,

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

industries 481 “Air transportation,” and 493 “Warehousing and storage,” had low employment before the downsizing. Consequently, we eliminate those industries from the primary analysis and consider them as a residual.

- We study the evolution of employment within the downsizing sectors vis-à-vis employment in the U.S. Total employment in Delaware follows the same pattern as total employment in the U.S. even during the financial crisis of 2007-2009. We test the series with econometric methods for possible structural changes at the time of significant downsizing announcements, but there are no analytical indications of changes in the Delaware-U.S. correlation. These results confirm that ups and downs in total employment in Delaware were the results of the same changes in the Business Cycle that affected the national economy.
- Applying the same kind of analysis to the employment of the individual sectors listed above, we find structural changes and no clear correlation between Delaware industries and those of the U.S. This confirms that the evolution of employment in the analyzed industries is the result of Corporate Downsizing and independent of the Business Cycle.
- Eight thousand two hundred eighty employees left the industries listed above due to the three facets of downsizing during the period under analysis from 2005 to 2018.
- Sector 551 includes the two largest downsizing corporations. Together they reduced employment by close to 4,000. One of them closed down a marketing and selling division, sector 424, “Merchant wholesalers, nondurable goods,” dismissing more than 2,000 employees. Importantly, the corporation consolidated some operations and

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

transferred close to one-third of those workers to a new location in the county, but the downsizing continued at the new site.

- The third sector, with a drop in employment of 941 since 2005, is NAICS 541, “Professional and technical services,” which is part of the largest corporation within the industry, and most of the employees were working in R&D.
- Total wages associated with employment lost in Corporate Downsizing reached \$1,613 million, in nominal terms, and \$1,749 million valued in 2018 prices.
- As with employment, the most significant amounts of wages lost were in industries 551, “Management of Companies and Enterprises,” with \$1,248 million and 424 with \$323 million, both figures in 2018 dollars.
- Financial services, one of the most dynamic industries in Delaware, went through a long process of transformation. The financial crisis of 2007-2009 affected the industry. However, losses in term of employment in the core banking, sector 522, “Credit intermediation and related activities,” were of 197 employees and \$52 million in real wages.
- “Securities, commodity contracts, investments,” NAICS 523, while the smaller of the financial services, was the only one posting increases of 103 jobs, and \$32 million in wages, despite the debacle in mortgage lending that is an essential activity of the industry.
- The classification of employment by occupation in each industry facilitated the identification of highly-skilled and lower-skilled labor downsized. We ordered those lost occupations according to annual wages per capita, setting a threshold of \$150,000.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

According to those parameters, the economy lost 1,495 highly-skilled employees during the 2007 to 2018 period, and about 65% of them were Delaware residents.

- If a former employee, falling between the parameters listed above, decides to leave the State following a new job elsewhere, the decision is not immediate. There was an annual average of 22 houses sold with values of more than \$500,000 within the Zip codes 19807 and 19707, the most likely locations of highly-skilled employees in the industries analyzed. There were 188 identified real estate transactions out of 826 within the Zip code 19807 and 76 out of 286 within 19707, during the period 2007-2018, highly correlated to the number of highly-skilled downsized employees.
- We estimate the direct and indirect economic impact of Corporate Downsizing for the period 2017 to 2022. Total Non-Farm Employment in New Castle County will drop by 20,726 employees while for the State of Delaware the loss will be 21,919 employees.
- Gross Domestic Product falls by \$2,430 million in NCC and \$2,547 million in the State, measured in millions of 2012 dollars, or 3.8% and 4.0%, respectively, of the Total Gross Domestic Product.
- Personal Income, which includes proprietors' income in addition to wages and salaries was estimated down by \$2,106 million in the County and \$2,304 in the State, both figures in millions of 2012 dollars.

Corporate Downsizing is a complex process that may continue in the years ahead, depending upon Delaware and National economic evolutions. Corporations that emerge as the results of spinoffs are adjusting themselves even though the parent firm introduced adjustments before. Consequently, and given the distinctive economic, demographic, and cultural characteristics

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

of the State of Delaware, the analysis of the Economic Impact of Corporate Downsizing deserves to be revisited going forward.

Introduction and Scope of Report

The Center for Applied Demography & Survey Research (CADSR) developed the methodology and necessary databases to measure the impact of Corporate Downsizing on the economy of the State of Delaware. The analysis begins in the year 2005 when the first news about downsizing appears in the press, and it extends to the third quarter of 2018, the last available data at the time of this report.

In the First Section, “Corporate Downsizing,” we briefly analyze the characteristics of Corporate Downsizing and the impact it has on employees and, to some extent, on the corporation itself.

In the Second Section, “The Situation in Delaware,” sub-section “Employment Changes due to Corporate Downsizing vs. due to the Business Cycle,” we use 6-digit NAICS¹--to identify and calculate employment and wages lost due to layoffs. At the same time, working with that level of data dis-aggregation allows finding different industrial codes that are attached to production plants, R&D labs, or offices that belong to the same corporation. Typically, a corporation has a single NAICS assigned at headquarters that may not identify all different industries involved. Previously, we had to estimate what part of those losses was due to the dismissals and what was a consequence of the normal business cycle. Confidentiality agreements preclude us from releasing the information at that level of detail (6-digit NAICS). Consequently, we aggregated

¹ North American Industry Classification System. Standard used by statistical agencies to classify business establishments.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

the data to a 3-digits NAICS, which cannot identify individual firms but does include enough information about the industry to which they belong.

An analysis of the changes in the staffing or occupational patterns follows in the sub-section “Occupation and Income of the Corporate Downsized Labor.” The Delaware Department of Labor and the U.S. Department of Labor put together tables based on surveys conducted annually. Those files include information about changes in the occupational structure for each relevant industry at the national and state level. The data is aggregated into 3-digits NAICS, facilitating the connection with employment and wage changes calculated in Chapter 2.

In the following sub-section, “Corporate Downsizing and the Local Real Estate Market,” after accounting for several assumptions, we identify what changes in the local real-estate market can be related to Corporate Downsizing. We built a database with transactions going back to the year 2000 with information from New Castle County’s parcel-search site complemented by data provided by several Real Estate Brokers. In this chapter, we show how the downsizing may have negatively affected the personal wealth of those laid-off employees forced to leave the State.

Finally, in the last sub-section, “The Economic Impact of Corporate Downsizing,” we combine the net losses in employment and wages with the personal wealth lost from previous sub-sections and estimate the Total Economic Impact using the REMI model. The results summarize the estimated economic impact of Corporate Downsizing on New Castle County and the whole State of Delaware with detailed views of production, income, and employment.

Corporate Downsizing

What is Corporate Downsizing and What are the Reasons for it?

The definition of Corporate Downsizing is the termination of numerous employees simultaneously and permanently. Usually, corporations eliminate employment to improve profits and corporation performance through the reduction of costs. Downsizing, different from termination of employment for cause, is not due to any conduct on the part of the employees. Dismissals also happen after a spinoff² when the process occurs before the downsizing; then, the corporation adjusts the level of production by reducing employment not necessarily all at one time but rather progressively. Within the State of Delaware, there are recent examples of the latter process that we study in the following chapters. There are several reasons for downsizing:

- a) When the economy weakens, reducing the demand for the corporation's products or services,
- b) When there are technological changes that make the product(s) obsolete or easily replaceable by newer ones,
- c) As a result of mergers or acquisitions,
- d) When facing high competition and there is a need to reduce costs,
- e) To improve corporate efficiency and competitiveness without a specific immediate cause.

² When a corporation creates a company independent from the parent corporation.

Regardless of the reason for the layoffs, the specialized literature identifies a more-than-substantial effect not only on the employees directly affected but also on those that remain working for the company and the corporation itself. Also, corporations may close branches or plants and consolidate the remaining employees, which could affect not only morale but also commuting patterns. There is evidence that downsizing may have adverse long-term outcomes: lower productivity due to the loss of human capital and “corporate memory.”³

Individuals affected by the layoffs could be the “direct victims” – those that leave – or “survivors” – those that remain. For the latter, the issue is the breach of the traditional or “psychological contract,” which involves the reciprocal obligations with their employer. That “psychological contract” is based on the idea of job security and probabilities of improvements traditionally provided by the employer as a trade-off for hard work, creativity, and fidelity from the employees. Once the unwritten agreement breaks, the two groups, “victims” and “survivors” have different behavior. The psychological implications of the breach of the unwritten contract are that employees must rely on themselves to reach their personal goals, and they are left with a sense of “betrayal.”⁴

As a result of the downsizing, those that leave the company fall into two main groups according to their technical capabilities and experience. Those with lower skills can generally find another job relatively easy. Some of them with long careers may opt for retirement, but the younger

3 Ernesto Noronha and Premilla D’Cruz, A Necessary Evil: The Experiences of Managers Implementing Downsizing Programmes
The Qualitative Report Volume 11 Number 1 March 2006 88-112 _ <http://www.nova.edu/ssss/QR/QR11-1/noronha.pdf>

4 Ibid, pg.4

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

usually look for jobs. Meanwhile, those with higher skills may find some difficulties depending upon the market conditions. Those that remain in the corporation face the effect of a sense of mistrust towards their employer, and many times, they compete among themselves in an attempt to secure their positions. This competition hurts production and R&D groups characterized by cooperation before the layoffs. Consequently, the risks of corporations downsizing, either for the “survivor” or the corporation itself do not end with the announcement of the dismissal. As a result, reductions in employment after the initial impact may be followed by desertions from surviving employees no longer confident about the stability of their job.

The Primary or Direct Employment Impact of Corporate Downsizing

The initial result of downsizing is a reduction in employment, which directly affects employees and their families. A secondary effect is on local business and their employees if the downsizing is the result of a business or plant closing or moving to a different location, reducing the demand for goods and services supplied locally. A third impact is on the real-estate market as those leaving the corporation may be forced to relocate. This is more significant in a small state like Delaware, as employment alternatives may be scarce. The closing of an automobile plant in New Castle County is an excellent example of the difficulties that a large number of layoffs can cause. At that time, the oil industry, with its revolution of shale extraction outside of the State, was a magnet for those with manufacturing skills like the former workers at the automobile plant. A sizeable number of those workers left the State in search of those jobs. However, once the initial supply of employment diminished - the groundbreaking stage was complete - and those workers were back in Delaware, the lack of job opportunities within the State reappears. Nevertheless, lower-skilled employees could indeed find alternative occupations in other industries, including services, with fewer difficulties than those with higher skills.

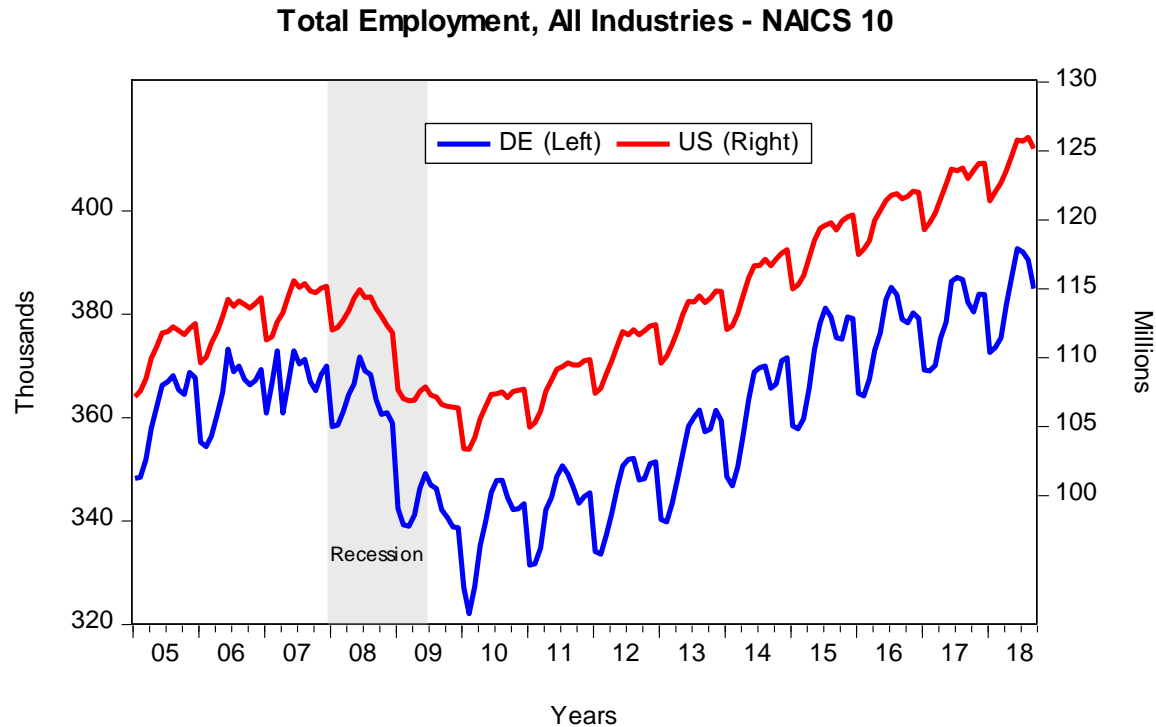
The Situation in Delaware

Employment Changes Due to Corporate Downsizing vs. Due to the Business Cycle

The first step to calculate changes in employment and wages caused by Corporate Downsizing is to differentiate them from movements originating in the normal business cycle. During a business cycle, firms usually adjust the level of production according to expectations of future demand; hence, there are some adjustments in employment which are temporary. That kind of production capacity adjustment is in contrast to the above definition of Corporate Downsizing, where the cutback in employment is permanent and in a large number of employees simultaneously.

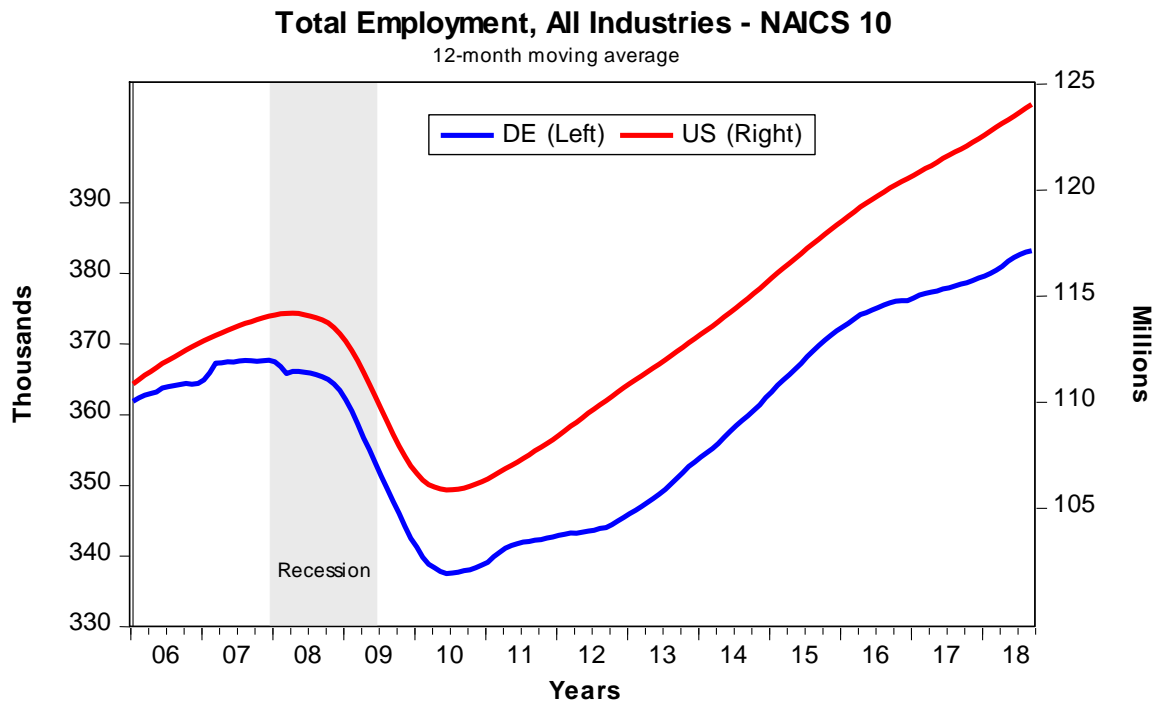
The best way to note the difference between those types of layoffs is by comparing the growth of employment in Delaware with the whole U.S., which acts as an average for all States. We begin the analysis with a graphical visualization of total employment.

Figure 1 – Evolution of Total Employment in the U.S. and Delaware



Total employment in the U.S. and Delaware follow the same pattern. The drop in employment from the previous peak in June 2007 to the trough in early 2009 (and the follow-up through early 2010) was the result of the financial crisis of 2007-2009. Both series show a correlation in seasonal movements and trend. A more accurate picture in Figure 2 plots the same series but smoothed by using a 12-month moving average method.

Figure 2 – Evolution of Total Employment in the U.S. and Delaware (12-month MA)



Again, both series follow a similar pattern. However, there is a possible difference in the slope between 2011 and 2012 and more evidently between 2016 and 2018. Changes in the slope of the Delaware series may indicate a structural change, which could be an indication that employment in Delaware follows a different path from the “average” represented by jobs in the U.S. To test the possibility of structural changes, we carried-on a Chow test for Stability of the Parameters⁵ and the test results are in Table 1.

⁵ Gregory C. Chow, “Tests of Equality Between Sets of Coefficients in Two Linear Regressions.”

Econometrica, vol. 28, no 3, 1960

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 1 – Chow Test for Stability of Parameters in the U.S. vs. DE Employment Regression.

Chow Breakpoint Dates: 2011M04, 2012M09, and 2016M03			
Null Hypothesis: No breaks at specified breakpoints			
Varying regressors: U.S. Total Employment			
Equation Sample: 2005M01 2018M09			
F-statistic	57.09878	Prob. F(6,157)	0.0000
Log-likelihood ratio	190.9953	Prob. Chi-Square(6)	0.0000
Wald Statistic	342.5927	Prob. Chi-Square(6)	0.0000

The results of the Chow Test indicate that there are no structural changes at any of the dates tested. As a result, we can conclude that U.S. and DE total employment followed the same seasonal and trend pattern and that Corporate Downsizing has not changed that relationship.⁶

The next step is to verify if the individual sectors where corporate layoffs happened have the same behavior vis-a-vis the national series. By using several publications such as The Wall Street Journal, Delawareonline.com, Barrons, Bloomberg, and others, as well as information provided by the Delaware State Department of Labor, we have identified the industries that launched Corporate Downsizing. They appear in Table 2.

The industries are aggregated into a 3-digits NAICS code to fulfill the non-disclosure requirements by Law. The Bureau of Labor Statistics publishes data on employment and wages at the State and County level, in some cases even at 6-digits NAICS level. However, when the number of firms in an industry is low, and it could allow the identification of individual firms,

⁶ In addition to the Chow Test we have analyzed the series applying the Dummy Variables alternative with similar results to the Chow Test.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

the BLS releases data only aggregated at 3 or 4 digits. We were able to work with the Unemployment Insurance files that list employment and wages with 6-digits NAICS, which allowed us to disaggregate the data according to the location, which usually has a different NAICS from the whole corporation. In the cases of a “spinoff,” merger, or acquisition, we continued the analysis using the data for the new firm at the plant level.

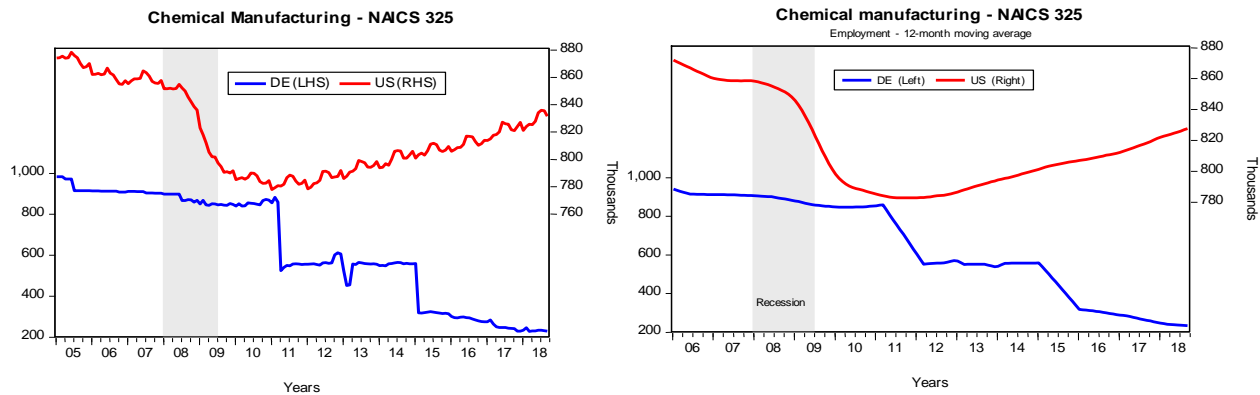
Table 2 – List of Downsizing Industries During the 2005 to 2018 Period.

NAICS	Description
325	Chemical manufacturing
326	Plastics and rubber products manufacturing
424	Merchant wholesalers, nondurable goods
425	Electronic markets and agents and brokers
481	Air transportation
493	Warehousing and storage
522	Credit intermediation and related activities
523	Securities, commodity contracts, investments
541	Professional and technical services
551	Management of companies and enterprises
711	Performing arts and spectator sports
713	Amusements, gambling, and recreation
721	Accommodation

We focus the analysis on NAICS 325, 424, 522, 523, 541, and 551. The remaining industries are omitted as they are less relevant in terms of employment than those listed. The evolution of the data for the industry, NAICS 325, is depicted in Figure 3.

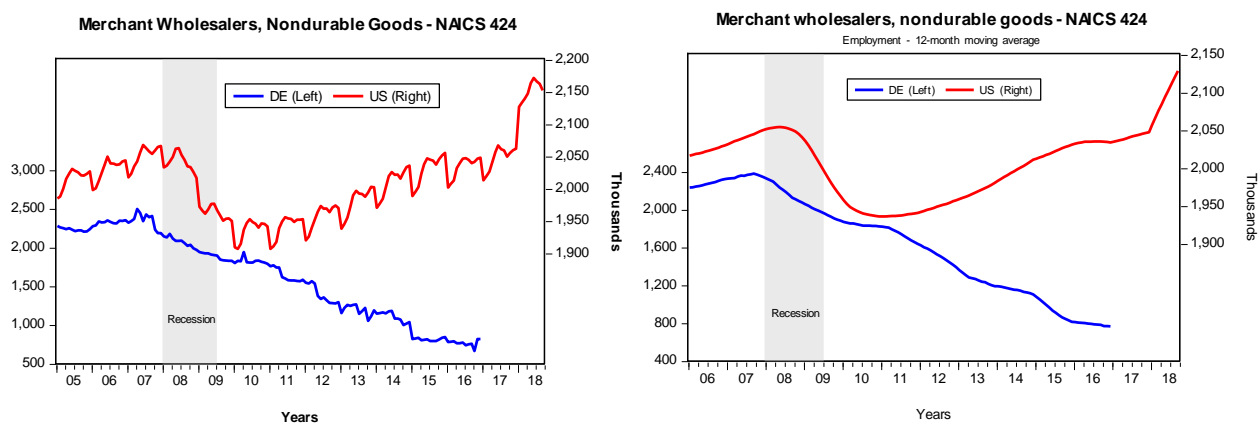
Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Figure 3 – Employment Changes Due to Downsizing in NAICS 325 in the U.S. and Delaware



Industry 325, “Chemical manufacturing,” has an entirely different evolution in Delaware than in the U.S.; there was a plant sale in 2015, but even after the layoffs carried out by the previous owner, the new firm continued reducing employment.

Figure 4 – Employment Changes Due to Downsizing in NAICS 424 in the U.S. and Delaware

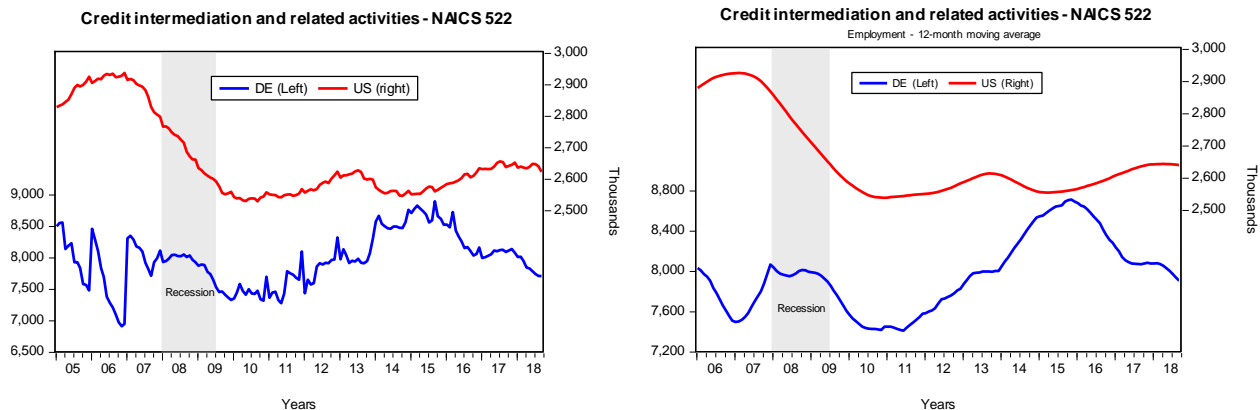


The industry identified with NAICS 424, “Merchant Wholesalers, Nondurable Goods,” is a critical example of Corporate Downsizing. The main corporate code is NAICS 551, but the marketing and sales division was under 424. The firm consolidated some of the employment from 424 into 551 by the end of 2016. It then discontinued the activity under 424 while at the same time reducing the number of employees at the main corporate office listed under 551. As

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

can be seen in Figure 4, since 2007, the number of employees listed under NAICS 424 steadily fell until the end of 2016.

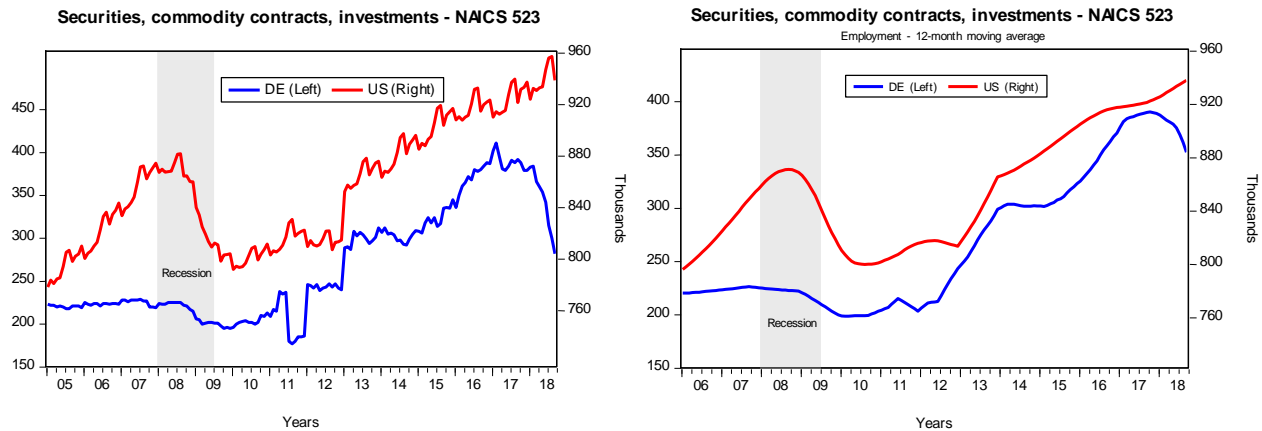
Figure 5 – Employment Changes Due to Downsizing in NAICS 522 in the U.S. and Delaware



Employment in firms consolidated under NAICS 522, “Credit Intermediation and Related Activities,” and NAICS 523, “Securities, Commodity Contracts, Investments,” and located in Delaware presents no clear correlation with the U.S. except 523 for short periods from 2012 to 2017 (see Figures 5 & 6). These industries are essential to the economic activity in Delaware, as they were part of the most dynamic sector for the last 30 years. Nevertheless, Financial Services in general and Banking, in particular, went through several mergers, acquisitions, and consolidations that injected considerable volatility to the number of firms and employment. Since November 2012, new banks, previously demonstrating very little activity within the State, acquired, bought, and reorganized operations. All that activity boosted employment until 2015. After that year, consolidation of services and the creation of synergies forced layoffs that continue through the present. It is not senseless to consider that technological, social, and market changes keep pressuring the financial industry into continuous overhauls, which may cause additional layoffs for an extended period.

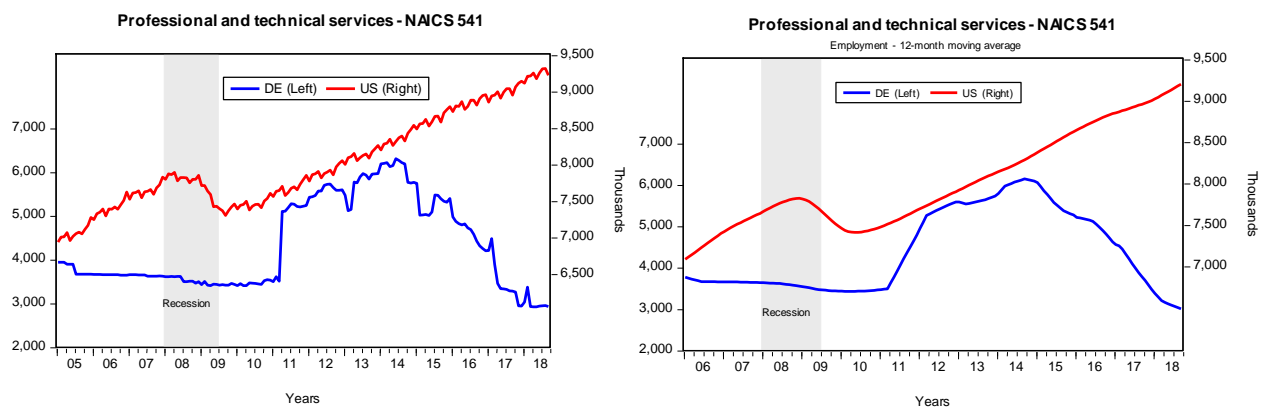
Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Figure 6 – Employment Changes Due to Downsizing in NAICS 523 in the U.S. and Delaware



Changes in the number of employees within NAICS 541, “Professional and Technical Services,” includes layoffs due to plant closings, firms leaving the State, and even bankruptcies. Except for three years (2011 – 2014), employment in the sector behaved in a completely different way than at the national level, which is in line with the Corporate Downsizing in Delaware not present with the same intensity in the rest of the country.

Figure 7 – Employment Changes Due to Downsizing in NAICS 541 in the U.S. and Delaware

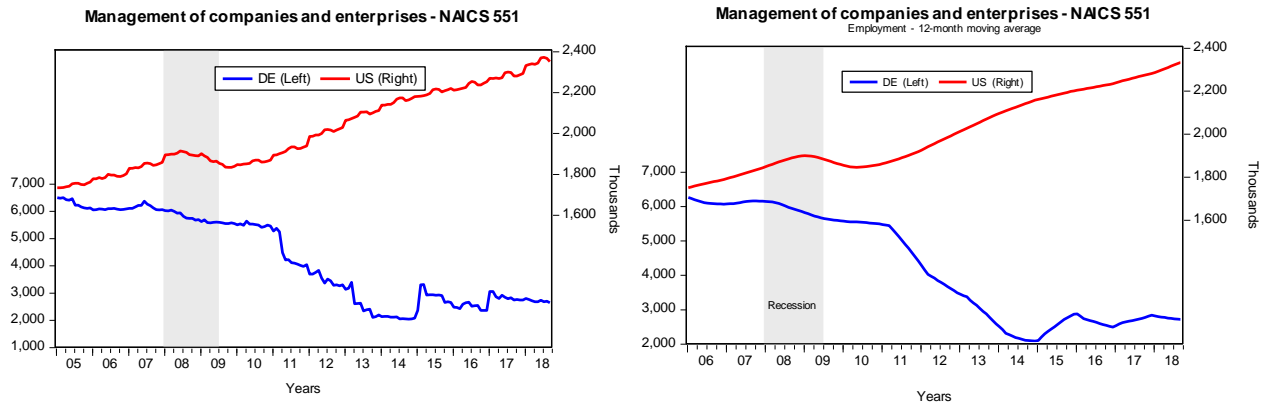


The last sector analyzed is NAICS 551: “Management of companies and enterprises.” Here is included, along with other large firms, the parent corporation of the division, part of NAICS 424,

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

shown in Figure 7 above, eliminated by the end of 2016. The data shown in Figure 8 gives a clear picture of the high impact of Corporate Downsizing on the State of Delaware.

Figure 8 – Employment Changes Due to Downsizing in NAICS 551 in the U.S. and Delaware



A correlation matrix calculated with data between 2005 and 2018 in Table 3 gives similar results to the analysis presented above. Except NAICS 523 that increases in step with the U.S. until 2017 when some reorganization began, all other industries show a different movement to those in the overall economy. That behavior is the result of the Corporate Downsizing implemented in the State of Delaware during the period analyzed and is the basis for our calculation of employment and wages lost.

Table 3 – Correlation Matrix Between Relevant Downsizing Sectors in Delaware and U.S.

	DE-Tot Emp	DE-325	DE-326	DE-424	DE-522	DE-523	DE-541	DE-551
US-Tot Emp	0.974	-0.766	-0.151	-0.927	0.673	0.873	-0.363	-0.671
US-325	0.959	-0.755	-0.189	-0.923	0.713	0.870	-0.323	-0.675
US-326	0.920	-0.812	-0.283	-0.959	0.721	0.921	-0.392	-0.678
US-424	0.979	-0.677	0.007	-0.873	0.699	0.810	-0.232	-0.682
US-522	0.212	-0.186	-0.370	-0.280	-0.101	0.429	-0.221	-0.303
US-523	0.906	-0.763	-0.192	-0.928	0.718	0.898	-0.306	-0.722
US-541	0.879	-0.820	-0.309	-0.960	0.730	0.925	-0.408	-0.676
US-551	0.866	-0.720	-0.262	-0.964	0.787	0.938	-0.223	-0.790

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

The analysis of all the above information allowed us to calculate the number of employees and the amount in wages that the State of Delaware and, most of all, New Castle County lost due to Corporate Downsizing. In Table 4, we show the net employment and wages lost due to downsizing.⁷

Table 4 – Estimated Employment and Wages Lost Due to Corporate Downsizing.

NAICS	325	424	522	523	541	551	Rest *	Total
Employees	-705	-2,231	-197	103	-941	-3,731	-588	-8,280
Total Wages (MM \$)	-\$59	-\$299	-\$42	\$30	-\$48	-\$1,149	-\$47	-\$1,613
Total Wages (MM \$) **	-\$64	-\$323	-\$52	\$32	-\$44	-\$1,248	-\$49	-\$1,749

* NAICS 326, 425, 481, 493, 711, 713, 721

** in 2018 \$ bn

Total net employment lost from 2005 to 2018 period was 8,280. Wages in nominal and real values (corrected for inflation) amounted to \$1,613 million and \$1,749 million, respectively in 2018. The industries with the most extensive layoffs were 551 and 424 as those are the NAICS for the largest corporations

The category “Rest” is the aggregation of the values corresponding to the NAICS indicated in the footnote * to Table 4. These are the values used in the following chapters to estimate the economic impact of the Corporate Downsizing on the State of Delaware. In the next section, we allocate employment changes according to the occupation of those that were laid off, which

⁷ We calculated the “net” value by using the pre-existing information about the layoffs and comparing that with the employment changes.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

allows us to create a pseudo-lost-income distribution function that helps to analyze the possible impact on the real estate market.

Occupation and Income of the Corporate Downsized Labor

There is no precise information about the previous occupation of those employees that were laid-off during the period under analysis. We tried to find Placement Companies that may be involved in the process of finding new jobs, especially for professionals and other high-grade employment to no avail, at least in Delaware. Consequently, we estimate the former occupations and income based on the Staffing Pattern files from the Delaware Department of Labor and the Bureau of Labor Statistics (BLS). We compare the occupational matrix of each industry analyzed in Chapter 2 for each year from 2007⁸ up to 2018 and applied those changes to the number of employees laid-off. At the same time, we supplement the calculated changes with information obtained from former and existing employees at some of the corporations.⁹

To calculate wages, we use as a base the annual publications from the OOLMI¹⁰ under the series “Delaware Wages.” Those annual documents have hourly wage rates calculated for almost all occupations. However, the data is the result of averages across all industries in Delaware, which has the downside of leveling out salaries from large corporations. Consequently, we have adjusted some of those annual rates with national data from the BLS.

The first business we analyze is “Chemical Manufacturing,” identified with NAICS 325. In Table 5, we summarize the main occupations for the years 2007 and 2018. To allow for wage

⁸ We begin the analysis in 2007 instead of 2005 as that is the earliest Staffing Pattern for Delaware.

⁹ As that information is largely “anecdotal”, we weighted the veracity before making any changes to the original data.

¹⁰ Office of Occupational and Labor Market Information, Delaware Department of Labor.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

comparison, we calculated nominal wages from 2007 in 2018 prices.¹¹ The table lists the number of employees and total salaries that belong to each occupation. The column “Difference” has the number of laid-off employees and the amount in wages (valued at 2018 prices) lost in the process.

Table 6 has the information for NAICS 326, “Plastic and Rubber Products, Manufacturing.” The data comparison is for a plant that belonged to a corporation listed under NAICS 551 that sold the plant to a different corporation. In this case, we have a combination of two components of Corporate Downsizing analyzed before: downsizing before a sale followed up by downsizing by the new owner. As a result, sector 326 lost 255 positions and almost \$6 million in annual wages.

The sector identified with NAICS 424, “Merchant Wholesalers, Nondurable Goods” was part of the NAICS 551, “Management of Companies and Enterprises.” The whole company began the downsizing process in 2011, and at the end of 2016 the division listed under NAICS 424 closed. The parent industry 551 absorbed some employees, but the layoffs continued until the end of 2018. Table 7 depicts the estimated distribution of different occupation and wages (in 2018 prices) lost with the closing of the branch listed under NAICS 424.

¹¹ We use the Consumer Price index.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 5 – Chemical Manufacturing – NAICS 325 (Wages at 2018 Prices)

Description	2007		2018		Difference	
	Employment	Wages	Employment	Wages	Employment	Wages
Total, All Occupations	904	\$96,074,509	238	\$20,610,945	(666)	(\$75,463,564)
Management Occupations	50	\$12,762,420	20	\$3,878,997	-30	-\$8,883,423
Business and Financial Operations Occupations	17	\$2,653,822	16	\$1,743,309	-1	-\$910,513
Computer and Mathematical Occupations	16	\$2,922,973	5	\$490,907	-11	-\$2,432,066
Architecture and Engineering Occupations	44	\$8,744,622	6	\$703,152	-38	-\$8,041,471
Life, Physical, and Social Science Occupations	35	\$4,774,854	22	\$2,666,487	-13	-\$2,108,367
Healthcare Practitioners and Technical Occupations	3	\$287,691	2	\$233,645	-1	-\$54,046
Healthcare Support Occupations	4	\$215,125	8	\$247,179	4	\$32,054
Protective Service Occupations	3	\$203,895			-3	-\$203,895
Building and Grounds Cleaning and Maintenance Occupations	2	\$98,252			-2	-\$98,252
Sales and Related Occupations	27	\$4,615,715	3	\$367,192	-24	-\$4,248,523
Office and Administrative Support Occupations	83	\$6,732,296	27	\$1,318,004	-56	-\$5,414,292
Construction and Extraction Occupations	8	\$938,579	2	\$144,592	-6	-\$793,987
Installation, Maintenance, and Repair Occupations	85	\$3,209,888	11	\$802,580	-74	-\$2,407,308
Production Occupations	501	\$45,964,447	115	\$7,949,005	-386	-\$38,015,442
Transportation and Material Moving Occupations	25	\$1,949,928	2	\$65,895	-23	-\$1,884,033

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 6 – Plastic and Rubber Products Manufacturing – NAICS 326 (Wages at 2018 Prices)

Description	2007		2018		Difference	
	Employment	Wages	Employment	Wages	Employment	Wages
Total, All Occupations	337	\$20,052,644	82	\$10,713,142	(255)	(\$9,339,502)
Management Occupations	15	\$2,645,295	4	\$1,490,713	-11	-\$1,154,582
Business and Financial Operations Occupations	7	\$658,367	4	\$841,085	-3	\$182,718
Computer and Mathematical Occupations	1	\$109,498	1	\$143,297	0	\$33,799
Architecture and Engineering Occupations	8	\$947,040	4	\$870,673	-4	-\$76,368
Building and Grounds Cleaning and Maintenance Occupations	19	\$611,234			-19	-\$611,234
Sales and Related Occupations	13	\$1,456,988	2	\$405,959	-11	-\$1,051,028
Office and Administrative Support Occupations	33	\$1,577,215	9	\$832,812	-24	-\$744,403
Construction and Extraction Occupations	5	\$355,783			-5	-\$355,783
Installation, Maintenance, and Repair Occupations	14	\$974,700	5	\$720,707	-9	-\$253,993
Production Occupations	165	\$8,127,070	48	\$4,834,497	-117	-\$3,292,573
Transportation and Material Moving Occupations	57	\$2,589,459	4	\$324,582	-53	-\$2,264,877

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 7 – Merchant Wholesalers, Nondurable Goods – NAICS 424 (Wages at 2018 Prices)

Description	2007	
	Employment	Wages
Total, All Occupations	2341	\$391,177,796
Management Occupations	305	\$100,708,304
Business and Financial Operations Occupations	144	\$29,431,262
Computer and Mathematical Occupations	126	\$25,113,004
Architecture and Engineering Occupations	50	\$11,476,818
Life, Physical, and Social Science Occupations	204	\$42,954,709
Legal Occupations	17	\$4,606,305
Design, Entertainment, Sports, and Media Occupations	11	\$1,287,473
Healthcare Practitioners and Technical Occupations	28	\$4,042,179
Protective Service Occupations	4	\$184,403
Building and Grounds Cleaning and Maintenance Occupations	19	\$1,135,000
Sales and Related Occupations	393	\$74,631,318
Office and Administrative Support Occupations	483	\$44,927,376
Farming, Fishing, and Forestry Occupations	7	\$383,312
Installation, Maintenance, and Repair Occupations	46	\$5,379,871
Production Occupations	108	\$12,010,784
Transportation and Material Moving Occupations	393	\$32,718,354

Financial Services has been one of the critical sectors in the Delaware economy since the early 1980s. First, with the administration of credit cards, after the financial reform of the 1980s, and later, facilitated by the business-friendly Judicial System, the sector was in a continuous expansion well into the 21st Century. However, Delaware could not be exempt from the business consolidation and the technological changes that drive the industry. Several banks have changed hands, new business models have entered and, as a result, financial institutions have adjusted to current times.

NAICS 522, “Credit Intermediation and Related Activities” includes the core activity of the financial sector. Large banks acquisitions and the impact of the 2007-2009 financial crisis

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

affected the industry negatively. However, given the size of the industry in terms of employment and wages, the adjustment during the whole period under analysis is modest.

Table 8 lists the main occupational categories impacted by Corporate Downsize on the NAICS 522 sector since 2007. Importantly, occupations like “Business and Financial Operations” and “Computer and Mathematical” expanded, while lower-skilled occupations, like “Office and Administrative Support,” bared the brunt of the downsizing.

Details of the staffing pattern for NAICS 523, “Securities, Commodity Contracts, and Other Financial Investments and Related Activities,” appear in Table 9. This industry has a handful of firms that are also part of the NAICS 522 and is the only one that posted increases in both employment and wages since 2007.

Table 10 has the occupational distribution of one of the two major sectors that posted the most significant number of layoffs. NAICS 541 “Professional, Scientific, and Technical Services,” includes the parent company of the closed-down division under NAICS 424 that we analyzed before. There was a net loss of 785 employees across almost every different occupation. The cause of the Corporate Downsizing in this sector could be market share losses or diminished competitiveness. In those cases, the possibility of recovery looks slim.

Table 11 covers the evolution of the most traditional industry in the State of Delaware, NAICS 551, “Professional, Scientific, and Technical Services. The main corporation within the sector downsized previously due to a merge, sold plants, moved operations out of the State, and spun off some business. Importantly, one new firm began downsizing immediately after the spin-off,

which is rare as normally a corporation “cleans” the division of excessive employment beforehand.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 8 – Credit Intermediation and Related Activities – NAICS 522 (Wages at 2018 Prices)

Description	2007		2018		Difference	
	Employment	Wages	Employment	Wages	Employment	Wages
Total, All Occupations	8,061	\$971,896,380	7,832	\$672,770,406	(229)	-\$299,125,975
Management Occupations	479	\$136,110,403	512	\$88,003,898	33	-\$48,106,505
Business and Financial Operations Occupations	1,657	\$232,853,664	2,524	\$228,882,603	867	-\$3,971,061
Computer and Mathematical Occupations	858	\$155,148,877	1,871	\$187,617,152	1013	\$32,468,275
Architecture and Engineering Occupations	2	\$447,974			-\$2	-\$447,974
Life, Physical, and Social Science Occupations	363	\$64,823,785			-\$363	-\$64,823,785
Legal Occupations	16	\$2,487,057	29	\$5,175,474	13	\$2,688,417
Arts, Design, Entertainment, Sports, and Media Occupations	21	\$2,784,132	19	\$1,299,627	(2)	-\$1,484,505
Healthcare Practitioners and Technical Occupations	2	\$268,949			(2)	-\$268,949
Protective Service Occupations	18	\$1,095,956	9	\$289,489	(9)	-\$806,467
Food Preparation and Serving Related Occupations	2	\$119,610			(2)	-\$119,610
Building and Grounds Cleaning and Maintenance Occupations	3	\$156,976			(3)	-\$156,976
Personal Care and Service Occupations	1	\$55,966			(1)	-\$55,966
Sales and Related Occupations	444	\$57,859,245	498	\$47,565,524	54	-\$10,293,721
Office and Administrative Support Occupations	4,102	\$310,409,810	2,366	\$113,673,491	(1736)	-\$196,736,319
Construction and Extraction Occupations	3	\$309,722			(3)	-\$309,722
Installation, Maintenance, and Repair Occupations	86	\$6,625,747	5	\$263,147	(81)	-\$6,362,600
Production Occupations	3	\$295,597			(3)	-\$295,597
Transportation and Material Moving Occupations	1	\$42,909			(1)	-\$42,909

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 9 – Securities, Commodity Contracts, and Other Financial Investments and Related Activities – NAICS 523 (Wages at 2018 Prices)

Description	2007		2018		Difference	
	Employment	Wages	Employment	Wages	Employment	Wages
Total, All Occupations	225	\$23,361,137	322	\$58,775,131	97	\$35,413,994
Management Occupations	30	\$5,874,644	26	\$8,920,885	(4)	\$3,046,241
Business and Financial Operations Occupations	66	\$7,619,971	88	\$19,763,652	22	\$12,143,681
Computer and Mathematical Occupations	20	\$2,525,987	22	\$4,150,353	2	\$1,624,366
Life, Physical, and Social Science Occupations	1	\$119,328			(1)	(\$119,328)
Legal Occupations	2	\$302,782	1	\$405,496	(1)	\$102,714
Arts, Design, Entertainment, Sports, and Media Occupations	4	\$285,294			(4)	(\$285,294)
Building and Grounds Cleaning and Maintenance Occupations	2	\$65,850			(2)	(\$65,850)
Sales and Related Occupations	24	\$2,588,415	94	\$17,591,399	70	\$15,002,984
Office and Administrative Support Occupations	75	\$3,978,866	91	\$7,943,346	16	\$3,964,480

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 10 – Professional, Scientific, and Technical Services – NAICS 541 (Wages at 2018 Prices)

Financial Services	2007		2018		Difference	
	Employment	Wages	Employment	Wages	Employment	Wages
Total, All Occupations	3646	\$335,687,990	2861	\$193,215,690	(785)	(\$142,472,300)
Management Occupations	158	\$28,815,644	154	\$21,129,309	(4)	\$1,846,388
Business and Financial Operations Occupations	449	\$41,982,178	316	\$20,657,880	22	\$1,846,388
Computer and Mathematical Occupations	558	\$59,488,461	494	\$37,042,991	2	\$10,587,358
Life, Physical, and Social Science Occupations	436	\$43,438,975	242	\$16,874,934	(1)	\$1,108,452
Legal Occupations	408	\$35,769,659	279	\$20,058,942	(1)	-\$143,700
Arts, Design, Entertainment, Sports, and Media Occupations	2	\$116,243			(4)	\$40,873
Building and Grounds Cleaning and Maintenance Occupations	376	\$55,724,512	356	\$36,727,613	(2)	-\$343,563
Sales and Related Occupations	2	\$172,447	1	\$62,029	70	-\$79,299
Office and Administrative Support Occupations	86	\$4,902,338	83	\$3,396,018	16	\$14,474,319
Healthcare Practitioners and Technical Occupations	61	\$5,196,452	90	\$4,643,434	29	\$3,151,827
Healthcare Support Occupations	22	\$730,908	19	\$416,361	(3)	-\$553,018
Protective Service Occupations	3	\$129,890	17	\$744,242	14	-\$314,547
Building and Grounds Cleaning and Maintenance Occupations	13	\$391,791	1	\$22,855	(12)	\$614,352
Personal Care and Service Occupations	10	\$304,104	11	\$214,249	1	-\$368,936
Sales and Related Occupations	163	\$13,210,134	110	\$6,832,745	(53)	-\$89,855
Office and Administrative Support Occupations	757	\$37,945,508	583	\$20,254,769	(174)	-\$6,377,389
Farming, Fishing, and Forestry Occupations	2	\$81,532				-\$17,690,739
Construction and Extraction Occupations	40	\$2,466,456	32	\$1,513,034	(8)	-\$81,532
Installation, Maintenance, and Repair Occupations	26	\$1,507,300	27	\$1,144,708	1	-\$953,422
Production Occupations	54	\$2,330,184	17	\$715,317	(37)	-\$362,592
Transportation and Material Moving Occupations	20	\$983,273	29	\$764,260	9	-\$219,013

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 11 – Management of Companies and Enterprises – NAICS 551 (Wages 2007 at 2018 Prices)

Description	2007		2018		Difference	
	Employment	Wages	Employment	Wages	Employment	Wages
Total, All Occupations	6,110	\$1,058,317,508	2,530	\$838,668,619	-3,580	(\$219,648,889)
Management Occupations	1,182	\$371,678,622	608	\$336,463,877	-574	(\$35,214,745)
Business and Financial Operations Occupations	1,351	\$257,533,216	638	\$181,655,351	-713	(\$75,877,865)
Computer and Mathematical Occupations	413	\$79,113,001	164	\$54,666,825	-249	(\$24,446,176)
Architecture and Engineering Occupations	81	\$19,367,149	131	\$46,994,015	50	\$27,626,866
Life, Physical, and Social Science Occupations	123	\$18,061,389	178	\$55,638,630	55	\$37,577,241
Legal Occupations	240	\$79,127,920	49	\$26,381,782	-191	(\$52,746,137)
Arts, Design, Entertainment, Sports, and Media Occupations	40	\$5,435,655	22	\$4,238,989	-18	(\$1,196,667)
Healthcare Practitioners and Technical Occupations	6	\$1,303,768	13	\$3,405,477	7	\$2,101,709
Protective Service Occupations	12	\$777,817	5	\$682,908	-7	(\$94,908)
Food Preparation and Serving Related Occupations	84	\$5,076,390	42	\$6,649,837	-42	\$1,573,447
Building and Grounds Cleaning and Maintenance Occupations	21	\$1,435,852	4	\$315,709	-17	(\$1,120,143)
Personal Care and Service Occupations	13	\$606,913	0	\$0	-13	(\$606,913)
Sales and Related Occupations	133	\$25,283,921	98	\$31,979,517	-35	\$6,695,596
Office and Administrative Support Occupations	2,263	\$179,449,780	520	\$78,398,257	-1,743	(\$101,051,522)
Construction and Extraction Occupations	6	\$790,900	15	\$3,741,613	9	\$2,950,713
Installation, Maintenance, and Repair Occupations	43	\$4,610,309	19	\$3,423,426	-24	(\$1,186,883)
Production Occupations	52	\$4,936,730	17	\$3,229,251	-35	(\$1,707,479)
Transportation and Material Moving Occupations	39	\$3,319,937	4	\$479,849	-35	(\$2,840,088)

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

As we have shown in Table 4 (page 29), the total employment downsized since 2005 was 8,289, with \$1,749 million in lost wages. To facilitate the analysis in the next section, we have calculated the full employment and wages lost per year since 2007 (2007 is the first year for which Staffing Patterns data is available for the State of Delaware). At the same time, we calculated wages per capita for each occupation and NAICS and then ordered them according to the amount. We set an annual threshold of \$150,000 in annual wages and estimated the number of laid-off employees each year whose annual wages per capita exceed that threshold. The amount selected as a breakpoint emerged from calculating the minimum yearly income necessary to afford a mortgage for a loan of \$500,000 or more. We are using the information listed in Table 12 to estimate the impact of Corporate Downsizing on the Real Estate Market.

Table 12 – Employment Losses Based on Wages Per Capita per Year

Year	2007	2008	2009	2010	2011	2012
Number of Emp. with Wages per capita > \$150,000	3717	3352	2397	2982	2893	2966
Total Number of Employees	22043	21251	20161	19884	19831	19766
% of Emp with Wages > \$150,000	17%	16%	12%	15%	15%	15%
Year	2013	2014	2015	2016	2017	2018
Number of Emp. with Wages per capita > \$150,000	2911	2688	2320	2181	3040	2222
Total Number of Employees	19029	19292	18518	16950	15009	14008
% of Emp with Wages > \$150,000	15%	14%	13%	13%	20%	16%
Year	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Number of Emp. with Wages per capita > \$150,000	-365	-955	585	-89	73	-55
% of Employment losses of Total Employment	-1.7%	-4.5%	2.9%	-0.4%	0.4%	-0.3%
Year	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Number of Emp. with Wages per capita > \$150,000	-223	-368	-139	859	-818	(1,495)
% of Employment losses of Total Employment	-1.2%	-1.9%	-0.8%	5.1%	-5.5%	

Corporate Downsizing and the Local Real Estate Market

As indicated when discussing the characteristics of Corporate Downsizing, those with the highest probabilities of finding a new job within the State work in lower-skills occupations. Higher-skilled and more-experienced employees, most of them professionals, faced a smaller market in Delaware as there are not many corporations within the same industry. Therefore, we focused the real estate analysis on the latter category of employees, which also has the highest wages within a corporation.

Highly-skilled newly-unemployed workers, moving to a different State to start new jobs, are likely selling their property in Delaware to buy another in their new place of residence. We chose \$500,000 as a minimum value for the property sold in Delaware based on the advice received from local Realtors. According to their experience, \$500,000 is the most likely lower end of a price range that highly-skilled professionals with annual incomes higher than \$150,000 could afford.

We built a database of real estate transactions, mostly within New Castle County beginning with selling or closing dates in the year 2002. The primary source of information is the New Castle County government.¹² Its internet site has a “Parcel Search” service that allows for obtaining information about all property transfers within the County. To identify properties, we used a database developed by CADSR that includes listings of Tax Ids for each parcel within the

¹² <http://www3.nccde.org/parcel/search/>

County. In the Parcel Search function of the NCC's site, there are plenty of characteristics about the transferred property: selling prices and dates, remodeling dates, the number of rooms, overall condition, construction date, acreage, and other features, which allow for a good description of the property.

In addition to the data from New Castle County, we obtained listing dates and selling prices for some of those transactions from local Realtors. While incomplete, the added information matched close to 70% of the property transfers within the selected price range and period.

The main variables we examined were the number of days that a property was on the market (the difference between listing and selling dates), and the discount between the listing price (asking price) and the selling price. Those two variables have a positive direct correlation.¹³ Usually, the longer a property for sale is on the market, the higher is the discount necessary to sell, and vice-versa.¹⁴

This phenomenon often happens when the asking price is higher than the market price, which is dependent upon the location and the recent selling prices for similar properties within the area. If the seller is under pressure to sell, either due to moving or financial difficulties, they would likely negotiate a lower price suitable for both parties. However, if not under pressure to sell, the seller would wait for better offers for a more extended period.

¹³ Having a positive direct correlation does not imply causality. We have run Granger Causality Tests and the results were negative. (Granger, C. W. J. (1969). "Investigating Causal Relations by Econometric Models and Cross-spectral Methods". *Econometrica*. **37** (3):

¹⁴ The calculation of days on the market is not precise as a property could be delisted and listed for sale at a later date with equal or different price.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

The analysis began by searching for real estate sales by year with prices listed as well as selling at higher than \$500,000 and allocating them by zip code. We set the minimum price for the analysis at that amount because it is in line with an annual income of \$150,000 or higher, which we set as a threshold in the previous chapter. From 2002 to 2018, 3,788 sales fulfilled the listing-selling-price criteria in New Castle County. Four zip codes out of 37 analyzed, contained 68% of those sales: 19807 (33%), 19707 (14%), 19803 (13%), and 19711 (8%). Out of those four zip codes, we eliminated from the analysis 19803 (City of Wilmington) and 19711 (City of Newark) as in those locations, employment is more related to local activities (City of Wilmington) or the University of Delaware (City of Newark).

Table 13 – Number of Real Estate Transactions for Zip Codes 19807, 19707, and NCC

Zip Code	19807	19707	All NCC
Year			
2005	61	33	206
2006	82	48	269
2007	67	49	271
2008	52	26	180
2009	44	18	148
2010	67	27	168
2011	38	12	122
2012	68	16	149
2013	56	30	164
2014	61	18	154
2015	68	19	176
2016	30	12	79
2017	68	27	231
2018	64	32	217
Total 2005-2018	826	367	2,534
Total 2007-2018	683	286	2,059

Table 13 lists the Real Estate transaction with listing and selling prices of \$500,000 or more closed between the years 2005 and 2018 for all NCC, along with zip codes 19807 and 19707.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

The total number of sales in NCC was 2,534, and zips 19807 and 19707 concentrated an average of 48% of the total sales. Between the years 2007 and 2018, transactions for all NCC amounted to 2,059 and Zips 19807 and 19707 maintained the same average percentages during the 2005 and 2018 period.

We centered the analysis on the period 2007 to 2018. As explained in the Introduction, the impact of Corporate Downsizing has a time lag from the initial announcement. Press reports and anecdotal information provided by ex-employees from a large corporation that initiated an adjustment indicated those that were ousted initially received severance and seniority-based compensation. That compensation gave more time to the newly-unemployed to find new jobs or decide about the future.¹⁵

There is not a technique (other than personal interviews) to identify the occupation and employment situation of buyers and sellers. The best alternative is to conduct a regression analysis relating discounts with dummy variables with values of 1 for the years 2007 to 2018 and 0 for the rest of the years, which act as proxies for the downsizing.¹⁶

¹⁵ Anecdotal information and some press reports indicate that after the initial round of downsizing, corporations changed their approach and reduced the amount of severance payments and in some cases they eliminated it completely.

¹⁶ We cannot use the actual number of occupations lost with wages per capita above the threshold as that data is comprised of a single observation per year versus discounts that follows a daily distribution.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

We ran three regressions using discounts as an independent variable. Table 14 shows the regression results for all real estate sales in NCC during the 2005 to 2018 period. The other two are for the zip codes 19807 and 19707.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 4 – Regression Analysis for All Real Estate Sales in NCC

Dependent Variable: DIS Method: Least Squares Sample: 1 149129 IF YR>=2005 AND PLIST>=500000 AND PSOLD>=500000 AND DIS>0 Included observations: 2535				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-175442.5	16542.74	-10.60541	0.0000
ROOMS	18622.56	955.9937	19.47979	0.0000
IRATE	6152.800	2149.532	2.862391	0.0042
DD07	11964.83	5494.516	2.177595	0.0295
DOM	350.2642	13.43339	26.07416	0.0000
R-squared	0.326225	Mean dependent var		77607.11
Adjusted R-squared	0.325159	S.D. dependent var		108756.2
S.E. of regression	89341.81	Akaike info criterion		25.64030
Sum squared resid	2.02E+13	Schwarz criterion		25.65181
Log-likelihood	-32494.08	Hannan-Quinn criter.		25.64447
F-statistic	306.2403	Durbin-Watson stat		1.730834
Prob(F-statistic)	0.000000			

Description of the variables used in all equations:

- The variable DIS is the difference between list price and sold price.
- ROOMS is an aggregation of the number of beds and bathrooms in the house.
- IRATE is the annual average of mortgage interest rates calculated by Freddy Mac,¹⁷ and it acts as a proxy for economic activity, higher rates when the economy is expanding and lower during a downturn.
- DOM is equal to the days lapsed between listing and sale dates.
- DD07 is a dummy variable with a value equal to 0 for the years 2005 and 2006 and 1 for all other years.

¹⁷ <http://www.freddiemac.com/pmms/pmms30.html>

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

The results of the regression in Table 14 are not unexpected. The goodness-of-fit (R Sq) is low, as is typical of this kind of regression with irregularly distributed data as opposed to time series regressions.

Table 15 shows the regression results for transactions located within zip code 19807.

Table 5 – Regression Analysis for All Real Estate Sales in Zip Code 19807

Dependent Variable: DIS Method: Least Squares Sample: 1 149129 IF YR>=2005 AND DIS>0 AND PLIST>500000 AND ZIP=19807 Included observations: 896				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-208637.1	36435.15	-5.726260	0.0000
ROOMS	20419.24	1801.851	11.33237	0.0000
IRATE	12640.96	5011.759	2.522261	0.0118
ACRES	1857.280	540.6857	3.435045	0.0006
DOM	427.2428	26.29958	16.24523	0.0000
DD07	12585.97	13270.29	0.948432	0.3432
R-squared	0.373857	Mean dependent var		120033.8
Adjusted R-squared	0.370339	S.D. dependent var		147719.9
S.E. of regression	117217.5	Akaike info criterion		26.18812
Sum squared resid	1.22E+13	Schwarz criterion		26.22025
Log-likelihood	-11726.28	Hannan-Quinn criter.		26.20040
F-statistic	106.2800	Durbin-Watson stat		1.884594
Prob(F-statistic)	0.000000			

As can be seen, the regression results for zip code 19807 are similar to those for NCC. We included the variable Acres, which is the size of the lot where the property is located. It was not included in the regression for NCC as it didn't improve the goodness-of-fit and the t-statistic made it irrelevant.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 6 – Regression Analysis for All Real Estate Sales in Zip Code 19707

Dependent Variable: DIS				
Method: Least Squares				
Sample: 1 149129 IF YR>=2005 AND DIS>0 AND PLIST>500000 AND PSOLD>=500000 AND ZIP=19707				
Included observations: 366				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-109248.6	27148.05	-4.024180	0.0001
ROOMS	10783.16	2099.367	5.136384	0.0000
ACRES	11164.91	1347.271	8.287057	0.0000
DD07	14169.61	7776.099	1.822200	0.0693
DOM	194.7352	25.69424	7.578945	0.0000
IRATE	3656.110	3124.439	1.170165	0.2427
R-squared	0.378042	Mean dependent var		49595.32
Adjusted R-squared	0.369403	S.D. dependent var		64539.85
S.E. of regression	51251.17	Akaike info criterion		24.54312
Sum squared resid	9.46E+11	Schwarz criterion		24.60710
Log likelihood	-4485.391	Hannan-Quinn criter.		24.56855
F-statistic	43.76336	Durbin-Watson stat		2.744545
Prob(F-statistic)	0.000000			

Table 16 has the results for transaction in zip code 19707. The variable Acres in this regression has better t-statistic than in Table 15 as this area contains more rural or suburban properties.

The results of the three equations shown in Tables 14 to 16 indicate that the maximum percentage of operations with discounts that may be related to Corporate Downsizing between 2007 and 2018 is 37% for the zip codes analyzed. However, the number of downsized employees with occupations that paid more than the \$150,000 threshold as listed in Table 12 (page 42) cannot be related directly to the number of Real Estate transactions listed in Table 13 (page 45). There is a significant number of in-commuters from neighboring States, especially Pennsylvania (mainly from Chester and Delaware counties,) that are part of the number of employees downsized. The Labor Department of the State of Delaware has estimated that 65% of those laid

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

off were Delaware residents at the moment of termination of employment. Other calculations are done quarterly by the BEA as part of the Personal Income by State data series. However, the latter includes not only Wages and Salaries but also Proprietary Income, which makes the information unsuitable to use in our analysis. Therefore, we utilized the percentage calculated by the Delaware Department of Labor. Also, the results of the equations show that only 37% of the discounts can be related to Corporate Downsizing, as indicated by their R Sq statistics.

Therefore, we have to correct that number according to the Home Ownership Rate as released by the U.S. Census Bureau,¹⁸ which averages 74.6% per year since 2000.

Consequently, we introduced those adjustments to the number of employees with wages per capita above the threshold that have been downsized since 2007. The result is a maximum of 22 transactions that are split proportionally between zips 19807 and 19707. We have identified 188 Real Estate sales in zip 19807 and 76 in zip 19707 with high correlation to the number of dismissals between the years 2007 and 2018. As explained above, the choice of 2007 as the initial year for the analysis was due to the decision of some corporations of eliminating severance compensation (see footnote 16 above.) The estimation of the number of transaction fitting the previously established characteristics (minimum price, per capita wage threshold.) allowed the calculation of personal wealth loses based on the amount of discount in each transaction. That estimation is conservative as we selected operations with lower discount and

¹⁸ Published by the Federal Reserve Bank of St. Louis - <https://fred.stlouisfed.org/series/DEHOWN>.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

excluded those for properties priced higher than \$2,000,000. Table 17 lists the total discounts per year, adjusted for inflation (2018 prices) for zip codes 19807 and 19707.

Table 7 – Estimated Personal Wealth Losses in Real Estate Transactions.

	19807	19707
2007	\$392,993	\$177,871
2008	\$678,902	\$167,138
2009	\$821,750	\$222,676
2010	\$817,286	\$133,145
2011	\$905,551	\$157,273
2012	\$717,265	\$104,385
2013	\$402,845	\$129,824
2014	\$764,399	\$113,590
2015	\$652,237	\$60,539
2016	\$1,632,604	\$205,116
2017	\$264,461	\$83,539
2018	\$467,976	\$124,246
Total	\$8,518,270	\$1,679,341

The amounts on Table 17 give an average of estimated Personal Wealth losses of \$45,300 for transactions on zip 19807 and \$22,100 for zip 19707. As stated above, these are conservative estimates that may increase if a direct identification of the transactions (via a survey) is conducted. Nevertheless, we consider those results a reasonable working hypothesis and use them in our calculations of the economic impact of Corporate Downsizing.

The Economic Impact of Corporate Downsizing

For the Economic Impact simulation, we used REMI Policy Insight +TM.¹⁹ REMI is a dynamic model with a multiplier effect through successive iterations (years) that finds equilibria in other parts of the State and surrounding area. Consequently, the multiplier effect is the cumulative impact of any change in the economy.

To include the cumulative impact of the multiplier, we inserted a column labeled “2017-22” that adds the values in each row for those years in every table. The value on the added column could be higher or lower than adding changes from 2017 to 2018. That difference is due to the beginning of a recovery in the row category (a switch from negative to a positive value), which could begin after 2018.

The economic impact of Corporate Downsizing in New Castle County and the State of Delaware is presented in Tables 18 and 19 below.

In Table 18, each private non-farm job of the 8,269 lost in our analysis has a multiplier of 2.5, which reduces employment by 20,726 jobs in NCC for the 2017 – 2022 simulation period. Employment Adjusted for Residence is the difference between employees living in the County and in-commuters.

¹⁹ REMI Policy Insight + is a sub-model of TranSight, Copyright © 2017. Regional Economic Models, Inc. Details of the REMI model are in Appendix B.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Gross Domestic Product (GDP) in NCC fell by \$2.43 billions of 2012 dollars during the 2017 – 2022 period, which represents 3.8% of the total GDP for the State.²⁰ Personal income falls by \$2.106 billion and disposable personal income (personal income after taxes) by \$1.821 billion. In terms of GDP, the drops were 3.3% and 2.9% of GDP at each classification of income.

Table 8 – Summary of the Economic Impact of Corporate Downsizing on NCC.

Category	Units	2017	2018	2017-22
Total Employment	Thousands (Jobs)	-20.699	-2.987	-21.986
Private Non-Farm Employment	Thousands (Jobs)	-20.125	-2.624	-20.726
Residence Adjusted Employment	Thousands (Jobs)	-12.192	-1.715	-12.829
Gross Domestic Product	Billions of 2012 Dollars	-2.288	-0.345	-2.43
Output	Billions of 2012 Dollars	-4.8	-0.656	-5.029
Personal Income	Billions of 2012 Dollars	-1.939	-0.111	-2.106
Disposable Personal Income	Billions of 2012 Dollars	-1.671	-0.095	-1.821

Table 19 includes the results for the State of Delaware. The difference in employment lost is 1,193 more jobs in the State, and the multiplier for Private Non-Farm Employment increased to 2.6 vs. 2.5 for NCC, which are the results of including the impact of Corporate Downsizing on Kent and Sussex counties.²¹

Table 9 – Summary of the Economic Impact of Corporate Downsizing on Delaware

Category	Units	2017	2018	2017-22
Total Employment	Thousands (Jobs)	-21.768	-0.092	-21.836
Private Non-Farm Employment	Thousands (Jobs)	-21.119	-2.867	-21.919
Residence Adjusted Employment	Thousands (Jobs)	-14.259	-2.162	-15.341
Gross Domestic Product	Billions of 2012 Dollars	-2.378	-0.367	-2.547
Output	Billions of 2012 Dollars	-4.991	-0.699	-5.267
Personal Income	Billions of 2012 Dollars	-2.089	-0.145	-2.304
Disposable Personal Income	Billions of 2012 Dollars	-1.797	-0.123	-1.989

²⁰ Latest GDP information for the State of Delaware released by the BEA is \$63.855 billions of 2012 dollars.

²¹ Detailed Economic Impact results on Kent and Sussex counties are in Appendix B.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Corporate Downsizing reduced the GDP of the State by \$2.547 billions of 2012 dollars, which represents 4.0% of the total GDP for the State. Meanwhile, personal income and disposable personal income at the State level lost \$2.304 and \$1.989 billions of 2012 dollars, respectively.

Tables 20 and 21 show the distribution of employment losses among industries in NCC and the State.

Table 20 – Economic Impact of Corporate Downsizing on Employment by Industry in NCC

Industries	Units	2017	2018	2017-22
All Non-Farm Private Industries	Thousands (Jobs)	-20.125	-2.625	-20.700
Construction	Thousands (Jobs)	-2.496	-0.969	-2.654
Manufacturing	Thousands (Jobs)	-1.146	-0.053	-1.080
Retail and Wholesale	Thousands (Jobs)	-5.105	-0.184	-5.144
Transportation and Public Utilities	Thousands (Jobs)	-0.471	-0.014	-0.384
Finance, Insurance & Real Estate	Thousands (Jobs)	-0.669	-0.340	-0.644
Services	Thousands (Jobs)	-10.222	-1.064	-10.783

Services, which includes industries identified as NAICS 541 and NAICS 551, is the sector with the most job losses. Those sectors together lost a total of 4,672 employees, with an implicit multiplier of 2.3 when compared to Services losses of 10,783 for the 2017-22 period. Following in importance is Retail and Wholesale, and NAICS 424 with a loss of 2,231 jobs is the main contributor to the reduction in 5,144 positions during the whole simulation period. The rest of the industries listed in Table 20 and Table 21 are the results of the interactions through purchases and sales among all sectors in the County and State.

Table 21 – Economic Impact of Corporate Downsizing on Employment by Industry in Delaware

Industries	Units	2017	2018	2017-22
All Non-Farm Private Industries	Thousands (Jobs)	-21.119	-2.867	-21.919
Construction	Thousands (Jobs)	-2.682	-1.075	-2.912
Manufacturing	Thousands (Jobs)	-1.246	-0.057	-1.178
Retail and Wholesale	Thousands (Jobs)	-5.358	-0.239	-5.460
Transportation and Public Utilities	Thousands (Jobs)	-0.493	-0.017	-0.406
Finance, Insurance & Real Estate	Thousands (Jobs)	-0.718	-0.349	-0.700
Services	Thousands (Jobs)	-10.600	-1.131	-11.223

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

In Table 21, the relationship among industries is similar. Services and Retail and Wholesale are the industries facing the largest losses. In both tables, employment losses in Finance, Insurance & Real Estate began recovering (posting positive results) before 2022. That is why total job losses in the 2017-22 period are lower than in 2017 and 2018 considered together. That earlier recovery, compared to the other industries, confirms the Financial sector as one of the most dynamic in the State.

Table 22 shows the distribution of Private, Non-Farm Employment among different occupations resulting from the economic impact simulation.

Table 10 – Economic Impact of Corporate Downsizing on Occupations in NCC.

Occupations	Units	2017	2018	2017-22
All Occupations	Thousands (Jobs)	-20.125	-2.625	-20.700
Management, business, and financial	Thousands (Jobs)	-3.358	-0.419	-3.415
Computer, mathematical, architecture, and engineering	Thousands (Jobs)	-1.290	-0.209	-1.385
Life, physical, and social science	Thousands (Jobs)	-0.167	-0.028	-0.192
Community and social service	Thousands (Jobs)	-0.184	-0.019	-0.205
Legal	Thousands (Jobs)	-0.163	-0.048	-0.203
Education, training, and library	Thousands (Jobs)	-0.335	-0.117	-0.555
Arts, design, entertainment, sports, and media	Thousands (Jobs)	-0.274	-0.036	-0.286
Healthcare	Thousands (Jobs)	-1.044	-0.075	-1.057
Protective service	Thousands (Jobs)	-0.181	-0.045	-0.245
Food preparation and serving related	Thousands (Jobs)	-0.867	-0.086	-0.921
Building and grounds cleaning and maintenance	Thousands (Jobs)	-1.111	-0.078	-1.087
Sales and related, office and administrative support	Thousands (Jobs)	-6.216	-0.646	-6.274
Construction and extraction	Thousands (Jobs)	-1.611	-0.548	-1.670
Installation, maintenance, and repair	Thousands (Jobs)	-0.941	-0.120	-0.933
Production	Thousands (Jobs)	-0.962	-0.065	-0.926
Transportation and material moving	Thousands (Jobs)	-1.391	-0.083	-1.318

The top three occupations along with Sales and Related account for close to 55% of the employment losses in NCC, and by 2022, there is only a minor recovery in Management, business, and financial (more detailed tables are in Appendix B). The lackluster performance of the top occupations in the simulation, which are high-skilled (typically professional) occupations

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

is not giving an encouraging picture of the economic future. It seems that there is an ongoing transformational process in the analyzed industries, those that downsized, toward an occupational structure that requires less highly qualified labor, which could hurt economic growth, income distribution, and quality of life.

Table 23 shows the predicted occupational distribution resulting from the economic impact analysis for the State of Delaware.

Table 11 – Economic Impact of Corporate Downsizing on Occupations in Delaware.

Occupations	Units	2017	2018	2017-22
All Occupations	Thousands (Jobs)	-21.119	-2.867	-21.919
Management, business, and financial	Thousands (Jobs)	-3.440	-0.438	-3.507
Computer, mathematical, architecture, and engineering	Thousands (Jobs)	-1.312	-0.213	-1.409
Life, physical, and social science	Thousands (Jobs)	-0.177	-0.029	-0.202
Community and social service	Thousands (Jobs)	-0.196	-0.023	-0.222
Legal	Thousands (Jobs)	-0.166	-0.049	-0.206
Education, training, and library	Thousands (Jobs)	-0.368	-0.135	-0.631
Arts, design, entertainment, sports, and media	Thousands (Jobs)	-0.284	-0.038	-0.298
Healthcare	Thousands (Jobs)	-1.123	-0.089	-1.149
Protective service	Thousands (Jobs)	-0.194	-0.051	-0.272
Food preparation and serving related	Thousands (Jobs)	-0.945	-0.103	-1.025
Building and grounds cleaning and maintenance	Thousands (Jobs)	-1.188	-0.092	-1.177
Sales and related, office and administrative support	Thousands (Jobs)	-6.508	-0.706	-6.615
Construction and extraction	Thousands (Jobs)	-1.725	-0.603	-1.821
Installation, maintenance, and repair	Thousands (Jobs)	-0.992	-0.134	-0.994
Production	Thousands (Jobs)	-1.021	-0.071	-0.983
Transportation and material moving	Thousands (Jobs)	-1.448	-0.094	-1.378

At the State level, the occupation distribution is similar to NCC during the 2017-18 period.

However, there is a faster recovery in some of the key occupations, like the top three, which is due to the economic activity in Kent and Sussex Counties. Those counties were only marginally affected by the Corporate Downsizing as their economic activity is more independent of the principal industries located in NCC.

Conclusion

We just analyzed the economic impact of the Corporate Downsizing on New Castle County and the State of Delaware between 2005 and 2018. We chose those firms identified in press reports, which resorted to reductions in employment to improve their economic and financial situation during the period of analysis. We focused the research on New Castle County, as all well-known downsizings happened in there.

We divided the analysis into five parts. First, we described the characteristics of corporate downsizing and the impact it has not only on the dismissed employees but also on the “survivors” and the corporation itself.

Second, we studied the evolution of total employment in Delaware and the U.S. We calculated employment losses in Delaware of 8,280 and wages of \$1,749 million in 2018 dollars.

Third, we calculated the occupational distribution of employment in each downsizing industry and estimated wages per-capita for each occupation in each sector. The number of jobs lost (8,280), and, among them, 1,495 with wages per-capita higher than \$150,000 per year.

Fourth, with the information from the previous sections, we analyzed the local real estate market. We centered the research on the zip codes 19807 and 19707, the most likely areas of residence for high-income employees from the downsizing firms. We found 2,059 sales of houses that fit the parameters for the search: a price of \$500,000 or more, few days on the market, and low

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

discount (we assume it was priced “to sell”). We identified 188 sales within zip code 19807, and 76 within zip code 19707. The total amount in estimated personal wealth lost during the 2007-2018 period amounted to \$8.5 million and 1.7 million, in 2018 dollars, for zip codes 19807 and 19707, respectively.

Finally, with all the information calculated in previous sections, we estimated the Economic Impact of Corporate Downsizing on the State of Delaware and New Castle County.

In terms of Private, Non-Farm Employment, New Castle County lost 20,125 jobs in 2017, 2,2625 in 2018, and 20,700 predicted for the whole period of 2017-2022. Total loses for the State in the same employment classification were 21,119 in 2017, 2,867 in 2018, and 21,919 predicted for the period 2017-2018. GDP fell in NCC by \$2,430 millions of 2012 dollars or 3.8% of Delaware’s GDP. In the State, GDP fell by 2,547 millions of 2012 dollars, or 4.0%, during the whole period.

The negative results of the study are of a sizable magnitude in New Castle County and the State. Importantly, the downsizing process may not be over, and more corporations may apply adjustments going forward if the conditions that forced the initial downsizing deteriorate even further.

Appendix A

Table 12 – Occupations in Chemical Manufacturing – NAICS 325 (Wages at 2018 Prices)

Description	2007		2018	
	Emp.	Wages	Emp.	Wages
Total, All Occupations	904	\$96,074,509	238	\$20,610,945
Management Occupations	47	\$12,762,420	20	\$3,878,997
Top Executives	12	\$3,710,587	3	\$605,983
Advertising, Marketing, Promotions, and Sales Managers	4	\$1,491,583	3	\$594,854
Operations Specialties Managers	23	\$5,204,737	11	\$1,774,332
Other Management Occupations	8	\$2,355,513	3	\$903,828
Business and Financial Operations Occupations	17	\$2,653,822	16	\$1,743,309
Business Operations Specialists	10	\$1,552,061	11	\$1,234,872
Financial Specialists	7	\$1,101,761	5	\$508,437
Computer and Mathematical Occupations	16	\$2,922,973	5	\$490,907
Computer Specialists	16	\$2,922,973		
Architecture and Engineering Occupations	44	\$8,744,622	6	\$703,152
Engineers	39	\$8,057,717	6	\$703,152
Drafters, Engineering, and Mapping Technicians	6	\$686,906		
Life, Physical, and Social Science Occupations	35	\$4,774,854	22	\$2,666,487
Life Scientists			15	\$1,954,257
Physical Scientists	18	\$2,845,344	4	\$493,271
Life, Physical, and Social Science Technicians	17	\$1,929,510	3	\$218,960
Healthcare Practitioners and Technical Occupations	3	\$287,691	2	\$233,645
Health Diagnosing and Treating Practitioners	2	\$214,513	2	\$135,785
Health Technologists and Technicians	1	\$73,178		
Healthcare Support Occupations	4	\$215,125	8	\$247,179
Other Healthcare Support Occupations	4	\$215,125	8	\$247,179
Protective Service Occupations	3	\$203,895		
First-Line Supervisors/Managers, Protective Service Workers	1	\$99,028		
Other Protective Service Workers	2	\$104,867		
Building and Grounds Cleaning and Maintenance Occupations	2	\$98,252		
Building Cleaning and Pest Control Workers	2	\$98,252		
Sales and Related Occupations	27	\$4,615,715	3	\$367,192
Supervisors, Sales Workers	1	\$192,788		
Retail Sales Workers	5	\$286,058		
Sales Representatives, Wholesale and Manufacturing	21	\$4,136,870	3	\$367,192
Office and Administrative Support Occupations	83	\$6,732,296	27	\$1,318,004
Supervisors, Office and Administrative Support Workers	4	\$494,608	3	\$230,381
Financial Clerks	5	\$423,267	1	\$53,783
Information and Record Clerks	10	\$736,440	5	\$228,541
Material Recording, Scheduling, and Distributing Workers	35	\$3,021,429	13	\$570,588
Secretaries and Administrative Assistants	10	\$887,289	5	\$234,712
Other Office and Administrative Support Workers	19	\$1,169,263		
Construction and Extraction Occupations	8	\$938,579	2	\$144,592
Construction Trades Workers	8	\$938,579	2	\$144,592
Installation, Maintenance, and Repair Occupations	85	\$3,209,888	11	\$802,580
Supervisors of Installation, Maintenance, and Repair Workers	4	\$566,480	1	\$88,195
Electrical and Electronic Equipment Mechanics	2	\$212,757		
Vehicle and Mobile Equipment Mechanics, Installers	3	\$306,516		
Other Installation, Maintenance, and Repair Occupations	76	\$2,124,136	10	\$714,385
Production Occupations	501	\$45,964,447	115	\$7,949,005
Supervisors, Production Workers	38	\$5,519,665	14	\$1,305,599
Assemblers and Fabricators	21	\$1,481,864		
Metal Workers and Plastic Workers	23	\$2,359,189		
Plant and System Operators	62	\$5,639,928		
Other Production Occupations	357	\$30,963,801	101	\$6,643,406
Transportation and Material Moving Occupations	25	\$1,949,928	2	\$65,895
Supervisors, Transportation and Material Moving Workers	1	\$124,591		
Motor Vehicle Operators	15	\$409,941		
Material Moving Workers	9	\$493,669	2	\$65,895

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 13 – Occupations in Plastics and Rubber Products Manufacturing – NAICS 326 (Wages 2007 at 2018

Description	2007		2018	
	Emp.	Wages	Emp.	Wages
Total, All Occupations	337	\$16,651,665	82	\$10,713,142
Management Occupations	15	\$2,196,646	4	\$1,490,713
Top Executives	5	\$846,185	1	\$407,563
Advertising, Marketing, Promotions, and Sales Managers	1	\$147,005		
Operations Specialties Managers	8	\$1,044,218	2	\$708,213
Other Management Occupations	1	\$159,238	1	\$374,936
Business and Financial Operations Occupations	7	\$546,706	4	\$841,085
Business Operations Specialists	5	\$381,176	3	\$651,865
Financial Specialists	2	\$165,530	1	\$189,220
Computer and Mathematical Occupations	1	\$90,927	1	\$143,297
Computer Specialists	1	\$90,927	1	\$143,297
Architecture and Engineering Occupations	8	\$786,420	4	\$870,673
Engineers	7	\$719,165	3	\$741,811
Drafters, Engineering, and Mapping Technicians	1	\$67,255	1	\$128,862
Building and Grounds Cleaning and Maintenance Occupations	19	\$507,567		
Building Cleaning and Pest Control Workers	19	\$507,567		
Sales and Related Occupations	13	\$1,209,879	2	\$405,959
Sales Representatives, Wholesale and Manufacturing	13	\$1,209,879	2	\$405,959
Office and Administrative Support Occupations	33	\$1,309,715	9	\$832,812
Supervisors of Office and Administrative Support Workers			1	\$154,947
Financial Clerks	5	\$219,276	1	\$108,518
Information and Record Clerks	9	\$354,533	1	\$92,225
Material Recording, Scheduling, and Distributing Workers	12	\$481,342	6	\$477,123
Secretaries and Administrative Assistants	2	\$88,792		
Other Office and Administrative Support Workers	5	\$165,772		
Construction and Extraction Occupations	5	\$295,441		
Construction Trades Workers	5	\$295,441		
Installation, Maintenance, and Repair Occupations	14	\$809,388	5	\$720,707
Supervisors of Installation, Maintenance, and Repair Workers	1	\$76,297		
Other Installation, Maintenance, and Repair Occupations	13	\$733,091	5	\$720,707
Production Occupations	165	\$6,748,698	48	\$4,834,497
Supervisors, Production Workers	10	\$782,548	5	\$940,823
Assemblers and Fabricators	24	\$882,297		
Metal Workers and Plastic Workers	55	\$2,152,523	19	\$1,486,196
Printing Workers	25	\$1,109,801	3	\$335,640
Textile, Apparel, and Furnishings Workers	9	\$371,650		
Other Production Occupations	42	\$1,449,879	20	\$2,071,837
Transportation and Material Moving Occupations	57	\$2,150,280	4	\$324,582
Supervisors, Transportation and Material Moving Workers	2	\$125,864		
Motor Vehicle Operators	5	\$239,142	1	\$101,089
Material Moving Workers	50	\$1,785,274	3	\$223,493

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 14 – Occupations in Merchant Wholesalers, Non-Durable Goods – NAICS 424 (Wages at 2018 Prices)

Description	2007	
	Employment	Wages
Total, All Occupations	2,341	\$324,833,051
Management Occupations	309	\$83,235,089
Top Executives	75	\$25,407,686
Advertising, Marketing, Promotions, and Sales Managers	72	\$22,757,599
Operations Specialties Managers	80	\$24,727,298
Other Management Occupations	82	\$27,815,721
Business and Financial Operations Occupations	160	\$24,500,503
Business Operations Specialists	127	\$23,212,767
Financial Specialists	33	\$6,218,495
Computer and Mathematical Occupations	127	\$21,161,704
Computer Specialists	97	\$19,025,679
Mathematical Scientists	30	\$6,087,325
Architecture and Engineering Occupations	49	\$9,474,684
Engineers	48	\$9,353,869
Drafters, Engineering, and Mapping Technicians	1	\$120,815
Life, Physical, and Social Science Occupations	185	\$35,461,248
Life Scientists	107	\$23,827,937
Physical Scientists	40	\$7,113,117
Social Scientists and Related Workers	1	\$196,419
Life, Physical, and Social Science Technicians	37	\$4,323,776
Legal Occupations	18	\$4,125,184
Lawyers, Judges, and Related Workers	10	\$3,224,504
Legal Support Workers	8	\$900,680
Education, Training, and Library Occupations	2	\$139,311
Librarians, Curators, and Archivists	2	\$139,311
Arts, Design, Entertainment, Sports, and Media Occupations	10	\$1,062,873
Art and Design Workers	4	\$288,344
Media and Communication Workers	6	\$774,529
Healthcare Practitioners and Technical Occupations	28	\$3,434,218
Health Diagnosing and Treating Practitioners	11	\$1,686,907
Health Technologists and Technicians	8	\$546,257
Other Healthcare Practitioners and Technical Occupations	9	\$1,201,054
Protective Service Occupations	3	\$153,128
Other Protective Service Workers	3	\$153,128
Building and Grounds Cleaning and Maintenance Occupations	19	\$942,501
Supervisors, Building and Grounds Cleaning and Maintenance	1	\$81,692
Building Cleaning and Pest Control Workers	18	\$860,809
Sales and Related Occupations	397	\$61,973,657
Supervisors, Sales Workers	15	\$2,726,135
Retail Sales Workers	37	\$1,889,853
Sales Representatives, Services	3	\$440,184
Sales Representatives, Wholesale and Manufacturing	334	\$56,346,316
Other Sales and Related Workers	8	\$571,170
Office and Administrative Support Occupations	479	\$37,307,579
Supervisors, Office and Administrative Support Workers	27	\$3,250,038
Financial Clerks	107	\$8,615,964
Information and Record Clerks	64	\$4,647,313
Material Recording, Scheduling, and Distributing Workers	100	\$6,504,489
Secretaries and Administrative Assistants	116	\$10,269,764
Other Office and Administrative Support Workers	65	\$4,020,012
Farming, Fishing, and Forestry Occupations	5	\$318,301
Agricultural Workers	5	\$216,176
Installation, Maintenance, and Repair Occupations	46	\$4,467,431
Supervisors of Installation, Maintenance, and Repair Workers	2	\$275,726
Electrical and Electronic Equipment Mechanics, and Repairers	1	\$83,481
Vehicle and Mobile Equipment Mechanics, Installers	6	\$497,309
Other Installation, Maintenance, and Repair Occupations	37	\$3,610,915
Production Occupations	109	\$9,973,724
Supervisors, Production Workers	22	\$2,969,422
Assemblers and Fabricators	18	\$1,168,020
Plant and System Operators	1	\$123,870
Other Production Occupations	68	\$5,639,108
Transportation and Material Moving Occupations	397	\$27,169,238
Supervisors, Transportation and Material Moving Workers	20	\$2,198,415
Motor Vehicle Operators	170	\$12,245,324
Other Transportation Workers	4	\$170,460
Material Moving Workers	203	\$12,555,039

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 15 – Occupations in Credit Intermediation and Related Activities – NAICS 522 (Wages at 2018 Prices)

Description	2007		2018	
	Employment	Wages	Employment	Wages
Total, All Occupations	8,061	\$808,535,116	7,832	\$672,770,406
Management Occupations	482	\$119,603,270	512	\$88,003,898
Top Executives	124	\$37,186,288	57	\$10,563,758
Advertising, Marketing, Promotions, and Sales Managers	157	\$36,757,582	62	\$10,809,641
Operations Specialties Managers	195	\$44,533,521	340	\$58,733,048
Other Management Occupations	6	\$1,125,878	53	\$7,897,451
Business and Financial Operations Occupations	1701	\$201,101,403	2524	\$228,882,603
Business Operations Specialists	485	\$64,468,824	549	\$49,550,532
Financial Specialists	1216	\$136,632,579	1975	\$179,332,071
Computer and Mathematical Occupations	799	\$119,675,765	1871	\$187,617,152
Computer Specialists	724	\$108,830,273	1578	\$160,086,429
Mathematical Scientists	75	\$10,845,492	293	\$27,530,723
Life, Physical, and Social Science Occupations	365	\$53,205,183		
Social Scientists and Related Workers	365	\$53,205,183		
Legal Occupations	16	\$2,597,376	29	\$5,175,474
Lawyers, Judges, and Related Workers	12	\$2,208,051	22	\$4,741,307
Legal Support Workers	4	\$389,325	7	\$434,167
Arts, Design, Entertainment, Sports, and Media Occupations	21	\$2,272,570	19	\$1,299,627
Art and Design Workers	5	\$554,929	1	\$56,427
Media and Communication Workers	16	\$1,717,641	18	\$1,243,200
Healthcare Practitioners and Technical Occupations	2	\$238,234		
Health Diagnosing and Treating Practitioners	2	\$238,234		
Protective Service Occupations	19	\$981,088	9	\$289,489
First-Line Supervisors/Managers, Protective Service Workers	2	\$162,554	2	\$90,540
Other Protective Service Workers	17	\$818,534	7	\$198,949
Food Preparation and Serving Related Occupations	1	\$31,539		
Food and Beverage Serving Workers	1	\$31,539		
Building and Grounds Cleaning and Maintenance Occupations	4	\$128,133		
Building Cleaning and Pest Control Workers	3	\$128,133		
Personal Care and Service Occupations	1	\$45,683		
Other Personal Care and Service Workers	1	\$45,683		
Sales and Related Occupations	446	\$47,672,453	498	\$47,565,524
Supervisors, Sales Workers	62	\$9,660,257	36	\$2,750,682
Retail Sales Workers	17	\$591,998	15	\$380,880
Sales Representatives, Services	184	\$25,704,523	446	\$44,364,185
Sales Representatives, Wholesale and Manufacturing	3	\$530,696		
Other Sales and Related Workers	180	\$11,184,979	1	\$69,777
Office and Administrative Support Occupations	4116	\$254,313,959	2366	\$113,673,491
Supervisors, Office and Administrative Support Workers	357	\$36,230,941	295	\$20,478,176
Communications Equipment Operators	4	\$199,221		
Financial Clerks	1057	\$57,530,590	761	\$36,144,171
Information and Record Clerks	1799	\$108,894,959	1025	\$43,876,068
Material Recording, Scheduling, and Distributing Workers	18	\$952,901	5	\$279,675
Secretaries and Administrative Assistants	169	\$12,009,814	110	\$6,489,850
Other Office and Administrative Support Workers	710	\$47,039,993	170	\$6,405,551
Construction and Extraction Occupations	1	\$85,064		
Construction Trades Workers	1	\$85,064		
Installation, Maintenance, and Repair Occupations	86	\$6,290,734	5	\$263,147
Supervisors of Installation, Maintenance, and Repair Workers	2	\$232,469	1	\$79,723
Electrical and Electronic Equipment Mechanics, and Repairers	48	\$3,400,358		
Other Installation, Maintenance, and Repair Occupations	36	\$2,657,906	4	\$183,424
Production Occupations	2	\$122,066		
Printing Workers	2	\$122,066		
Transportation and Material Moving Occupations	1	\$35,024		
Other Transportation Workers	1	\$35,024		

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 16 – Occupations in Securities, and Other Financial Investments – NAICS 523 (Wages at 2018 Prices)

Description	2007		2018	
	Employment	Wages	Employment	Wages
Total, All Occupations	225	\$19,399,029	322	\$58,775,131
Management Occupations	30	\$4,878,290	26	\$8,920,885
Top Executives	4	\$715,734	7	\$2,551,635
Advertising, Marketing, Promotions, Public Relations, and Sales	5	\$830,129	5	\$1,778,535
Operations Specialties Managers	21	\$3,332,426	13	\$4,310,351
Other Management Occupations			1	\$280,364
Business and Financial Operations Occupations	66	\$6,327,605	88	\$19,763,652
Business Operations Specialists	4	\$338,543	12	\$2,022,074
Financial Specialists	62	\$5,989,062	76	\$17,741,578
Computer and Mathematical Occupations	20	\$2,097,573	22	\$4,150,353
Computer Specialists	20	\$1,998,369		
Mathematical Scientists	1	\$99,204	2	\$349,601
Life, Physical, and Social Science Occupations	1	\$99,090		
Social Scientists and Related Workers	1	\$99,090		
Legal Occupations	2	\$251,430	1	\$405,496
Lawyers, Judges, and Related Workers	1	\$185,430	1	\$405,496
Legal Support Workers	1	\$65,999		
Arts, Design, Entertainment, Sports, and Media Occupations	4	\$236,907		
Art and Design Workers	1	\$57,409		
Media and Communication Workers	3	\$179,498		
Building and Grounds Cleaning and Maintenance Occupations	2	\$54,681		
Building Cleaning and Pest Control Workers	2	\$54,681		
Sales and Related Occupations	24	\$2,149,413	94	\$17,591,399
Supervisors of Sales Workers			4	\$724,393
Sales Representatives, Services	21	\$2,026,005	90	\$16,867,006
Other Sales and Related Workers	3	\$123,408		
Office and Administrative Support Occupations	75	\$3,304,040	91	\$7,943,346
Supervisors, Office and Administrative Support Workers	4	\$275,270	8	\$783,668
Financial Clerks	14	\$652,222	9	\$630,429
Information and Record Clerks	19	\$822,857	38	\$3,604,495
Secretaries and Administrative Assistants	16	\$773,312	20	\$2,066,014
Other Office and Administrative Support Workers	22	\$780,380	16	\$858,740

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 17 – Occupations in Professional, Scientific, and Technical Services – NAICS 541 (Wages at 2018 Prices

Description	2007		2018	
	Employment	Wages	Employment	Wages
Total, All Occupations	3,646	\$278,754,456	2,861	\$193,215,690
Management Occupations	161	\$24,071,207	154	\$21,129,309
Top Executives	50	\$8,366,172	36	\$5,143,333
Advertising, Marketing, Promotions, and Sales Managers	19	\$2,590,237	21	\$2,811,936
Operations Specialties Managers	58	\$8,040,993	53	\$6,907,231
Other Management Occupations	34	\$5,073,805	44	\$6,266,809
Business and Financial Operations Occupations	468	\$37,561,157	316	\$20,657,880
Business Operations Specialists	228	\$20,665,323	145	\$9,892,064
Financial Specialists	240	\$16,895,834	171	\$10,765,816
Computer and Mathematical Occupations	559	\$49,467,516	494	\$37,042,991
Computer Specialists	555	\$49,110,656	482	\$36,042,329
Mathematical Scientists	4	\$356,860	12	\$1,000,662
Architecture and Engineering Occupations	441	\$35,594,627	242	\$16,874,934
Architects, Surveyors, and Cartographers	65	\$4,723,628	27	\$1,835,752
Engineers	253	\$24,200,788	136	\$11,692,004
Drafters, Engineering, and Mapping Technicians	123	\$6,670,210	79	\$3,347,178
Life, Physical, and Social Science Occupations	386	\$30,125,088	279	\$20,058,942
Life Scientists	86	\$9,508,001	45	\$3,283,453
Physical Scientists	99	\$8,912,233	178	\$14,369,355
Social Scientists and Related Workers	8	\$539,357	5	\$234,560
Life, Physical, and Social Science Technicians	193	\$11,165,497	51	\$2,171,574
Community and Social Services Occupations	2	\$94,182		
Counselors, Social Workers, and Social Service Specialists	2	\$94,182		
Legal Occupations	361	\$44,539,501	356	\$36,727,613
Lawyers, Judges, and Related Workers	235	\$37,060,899	167	\$27,830,991
Legal Support Workers	126	\$7,478,602	189	\$8,896,622
Education, Training, and Library Occupations	2	\$139,719	1	\$62,029
Librarians, Curators, and Archivists	2	\$139,719	1	\$62,029
Arts, Design, Entertainment, Sports, and Media Occupations	111	\$3,941,991	83	\$3,396,018
Art and Design Workers	85	\$2,723,477	63	\$2,481,176
Media and Communication Workers	11	\$716,029	13	\$715,552
Media and Communication Equipment Workers	15	\$502,485	7	\$199,290
Healthcare Practitioners and Technical Occupations	61	\$4,278,842	90	\$4,643,434
Health Diagnosing and Treating Practitioners	28	\$3,006,206	21	\$1,993,208
Health Technologists and Technicians	31	\$1,135,411	50	\$1,397,107
Other Healthcare Practitioners and Technical Occupations	2	\$137,225	19	\$1,253,119
Healthcare Support Occupations	22	\$592,191	19	\$416,361
Other Healthcare Support Occupations	22	\$592,191	19	\$416,361
Protective Service Occupations	3	\$105,239	17	\$744,242
Supervisors of Protective Service Workers			1	\$63,023
Fire Fighting and Prevention Workers			14	\$595,853
Other Protective Service Workers	3	\$105,239	2	\$85,366
Building and Grounds Cleaning and Maintenance Occupations	13	\$317,433	1	\$22,855
Building Cleaning and Pest Control Workers	11	\$259,510	1	\$22,855
Grounds Maintenance Workers	2	\$57,923		
Personal Care and Service Occupations	11	\$269,198	11	\$214,249
Animal Care and Service Workers	11	\$269,198	11	\$214,249
Sales and Related Occupations	159	\$10,559,265	110	\$6,832,745
Supervisors, Sales Workers	9	\$822,678	3	\$223,286
Retail Sales Workers	4	\$107,140	2	\$41,762
Sales Representatives, Services	77	\$6,230,063	73	\$4,351,949
Sales Representatives, Wholesale and Manufacturing	12	\$1,238,830	14	\$1,167,314
Other Sales and Related Workers	57	\$2,160,554	18	\$1,048,434
Office and Administrative Support Occupations	765	\$30,932,171	583	\$20,254,769
Supervisors, Office and Administrative Support Workers	39	\$2,289,870	33	\$1,771,414
Communications Equipment Operators	2	\$60,744		
Financial Clerks	127	\$5,228,342	131	\$4,801,635
Information and Record Clerks	129	\$4,197,209	129	\$3,524,959
Material Recording, Scheduling, and Distributing Workers	32	\$1,192,966	50	\$1,756,630
Secretaries and Administrative Assistants	288	\$13,213,986	152	\$6,085,329
Other Office and Administrative Support Workers	148	\$4,749,054	88	\$2,314,802
Construction and Extraction Occupations	40	\$1,997,208	32	\$1,513,034
Supervisors of Construction and Extraction Workers			4	\$249,284
Construction Trades Workers	19	\$914,693	3	\$0
Other Construction and Related Workers	21	\$1,082,515	25	\$1,263,750
Installation, Maintenance, and Repair Occupations	26	\$1,284,143	27	\$1,144,708
Supervisors of Installation, Maintenance, and Repair Workers			3	\$184,945
Electrical and Electronic Equipment Mechanics, and Repairers			8	\$373,108
Other Installation, Maintenance, and Repair Occupations	26	\$1,284,143	16	\$586,655
Production Occupations	51	\$2,054,089	17	\$715,317
Supervisors, Production Workers	2	\$145,401	1	\$65,187
Assemblers and Fabricators	8	\$282,545		
Metal Workers and Plastic Workers	24	\$1,197,708	2	\$92,648
Plant and System Operators			2	\$103,586
Other Production Occupations	17	\$428,436	9	\$341,420
Transportation and Material Moving Occupations	20	\$796,660	29	\$764,260
Supervisors, Transportation and Material Moving Workers	3	\$179,288		
Motor Vehicle Operators	13	\$481,740	1	\$32,243
Material Moving Workers	4	\$135,631	27	\$732,017

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 30 – Occupations in Management of Companies and Enterprises – NAICS 551 (Wages at 2018 Prices)

Description	2007		2018	
	Employment	Wages	Employment	Wages
Total, All Occupations	6,110	\$878,824,177	2,530	\$838,668,619
Management Occupations	1,182	\$308,640,986	608	\$336,463,877
Top Executives	182	\$62,038,796	93	\$55,517,016
Advertising, Marketing, Promotions, and Sales Managers	185	\$59,639,190	150	\$85,705,076
Operations Specialties Managers	441	\$124,731,078	256	\$140,741,034
Other Management Occupations	374	\$62,231,923	109	\$54,500,751
Business and Financial Operations Occupations	1,351	\$213,854,930	638	\$181,655,351
Business Operations Specialists	792	\$129,468,152	374	\$108,162,371
Financial Specialists	559	\$84,386,778	264	\$73,492,980
Computer and Mathematical Occupations	413	\$65,695,235	164	\$54,666,825
Computer Specialists	376	\$59,415,059	153	\$51,273,495
Mathematical Scientists	37	\$6,280,177	11	\$3,393,330
Architecture and Engineering Occupations	81	\$16,082,431	131	\$46,994,015
Architects, Surveyors, and Cartographers			2	\$499,430
Engineers	81	\$16,082,481	125	\$45,690,506
Drafters, Engineering, and Mapping Technicians			4	\$804,079
Life, Physical, and Social Science Occupations	123	\$14,998,131	178	\$55,638,630
Life Scientists			17	\$7,024,228
Physical Scientists	9	\$1,296,529	103	\$36,429,784
Social Scientists and Related Workers	114	\$13,701,603		
Life, Physical, and Social Science Technicians			58	\$12,184,619
Legal Occupations	240	\$65,707,624	49	\$26,381,782
Lawyers, Judges, and Related Workers	158	\$57,779,431	34	\$23,418,201
Legal Support Workers	82	\$7,928,193	15	\$2,963,581
Arts, Design, Entertainment, Sports, and Media Occupations	40	\$4,513,755	22	\$4,238,989
Art and Design Workers	6	\$518,962	7	\$898,176
Media and Communication Workers	34	\$3,694,481	15	\$3,340,813
Healthcare Practitioners and Technical Occupations	6	\$1,082,646	13	\$3,405,477
Health Diagnosing and Treating Practitioners	3	\$661,269	2	\$488,068
Other Healthcare Practitioners and Technical Occupations	3	\$421,377	11	\$2,917,409
Protective Service Occupations	12	\$645,897	5	\$682,908
First-Line Supervisors/Managers, Protective Service Workers	2	\$167,539	1	\$146,976
Other Protective Service Workers	10	\$478,358	4	\$535,932
Food Preparation and Serving Related Occupations	84	\$4,215,421	42	\$6,649,837
Supervisors, Food Preparation and Serving Workers	18	\$1,539,016	40	\$6,467,446
Cooks and Food Preparation Workers	24	\$1,106,515	2	\$182,391
Food and Beverage Serving Workers	29	\$1,166,805		
Other Food Preparation and Serving Related Workers	13	\$403,086		
Building and Grounds Cleaning and Maintenance Occupations	21	\$1,192,328	4	\$315,709
Supervisors, Building and Grounds Cleaning and Maintenance	6	\$530,248		
Building Cleaning and Pest Control Workers	15	\$662,080	4	\$315,709
Personal Care and Service Occupations	13	\$503,979		
Supervisors, Personal Care and Service Workers	1	\$78,029		
Entertainment Attendants and Related Workers	10	\$335,337		
Transportation, Tourism, and Lodging Attendants	2	\$90,612		
Sales and Related Occupations	133	\$20,995,704	98	\$31,979,517
Supervisors, Sales Workers	8	\$1,248,369	12	\$3,856,257
Retail Sales Workers	2	\$77,737	1	\$86,300
Sales Representatives, Services	81	\$13,172,425	19	\$5,823,759
Sales Representatives, Wholesale and Manufacturing	34	\$5,330,433	64	\$21,748,883
Other Sales and Related Workers	8	\$1,166,740	2	\$464,317
Office and Administrative Support Occupations	2,263	\$149,014,642	520	\$78,398,257
Supervisors, Office and Administrative Support Workers	51	\$5,926,224	20	\$4,437,092
Communications Equipment Operators	2	\$97,747		
Financial Clerks	125	\$9,725,101	241	\$37,296,292
Information and Record Clerks	189	\$12,825,640	89	\$11,818,124
Material Recording, Scheduling, and Distributing Workers	16	\$1,410,329	8	\$1,190,799
Secretaries and Administrative Assistants	440	\$41,106,105	111	\$18,339,779
Other Office and Administrative Support Workers	1,440	\$79,229,887	51	\$5,316,171
Construction and Extraction Occupations	6	\$656,761	15	\$3,741,613
Supervisors of Construction and Extraction Workers			13	\$3,348,427
Construction Trades Workers	6	\$656,761	2	\$393,186
Installation, Maintenance, and Repair Occupations	43	\$3,828,389	19	\$3,423,426
Supervisors of Installation, Maintenance, and Repair Workers	2	\$270,670	2	\$509,583
Vehicle and Mobile Equipment Mechanics, Installers	1	\$87,823	2	\$433,798
Other Installation, Maintenance, and Repair Occupations	40	\$3,469,896	15	\$2,480,046
Production Occupations	52	\$4,099,448	17	\$3,229,251
Supervisors, Production Workers	8	\$1,144,687	1	\$269,416
Food Processing Workers	6	\$286,626	3	\$188,676
Printing Workers	19	\$1,613,802		
Plant and System Operators			5	\$1,049,987
Other Production Occupations	17	\$958,208	8	\$1,721,171
Transportation and Material Moving Occupations	39	\$2,756,867	4	\$479,849
Supervisors, Transportation and Material Moving Workers	4	\$389,173		
Motor Vehicle Operators	24	\$1,828,852	2	\$289,481
Other Transportation Workers	5	\$200,100		
Material Moving Workers	6	\$338,742	2	\$190,368

Appendix B

The REMI PI+ Model

The REMI PI+ Model is a dynamic forecasting and policy analysis tool of the economy of Delaware, capable of simulating and estimating causal relationships. Contrary to other models, especially Input-Output models (RIMS II, IMPLAN,) REMI incorporates several modeling approaches, combining the strengths of econometric, Input-Output, and dynamic models while overcoming the limitations of each of them individually. The result is a comprehensive model that answers “what if...?” questions about the economy.

At its core, the REMI model incorporates the entire inter-industry relationships found in input-output models. REMI models are dynamic; they demonstrate economic changes over time, allowing firms and individuals to modify their behavior in response to changing economic conditions. General Equilibrium Economic Theory is the basis for the modeling of those responses.

The REMI model used in this economic impact analysis is a regionalized version of a benchmarked national model. There are ten geographic sub-regions formed by counties and their

aggregations that account for all local economic activity. The core region is the State of Delaware and its three counties. Salem County and the combination of Burlington, Camden, and Gloucester counties represent the State of New Jersey. Bucks, Montgomery, and Philadelphia counties (combined), and Delaware and Chester counties (combined) are the counties included from Pennsylvania. For Maryland, Cecil County, Harford County, and a combination of 10 counties in Maryland and Virginia complete the remaining part of the Delmarva Peninsula.

Nevertheless, each sub-region is treated in the model as an independent, wholly functioning economy, which interacts with other sub-region and the nation. To simulate the economic impact of the Corporate Downsizing, we consider only two regions: New Castle County and the State of Delaware. The rest of the counties listed above, interact with New Castle, Kent, and Sussex counties but the results are not part of the Economic Impact of Corporate Downsizing in NCC and Delaware.²²

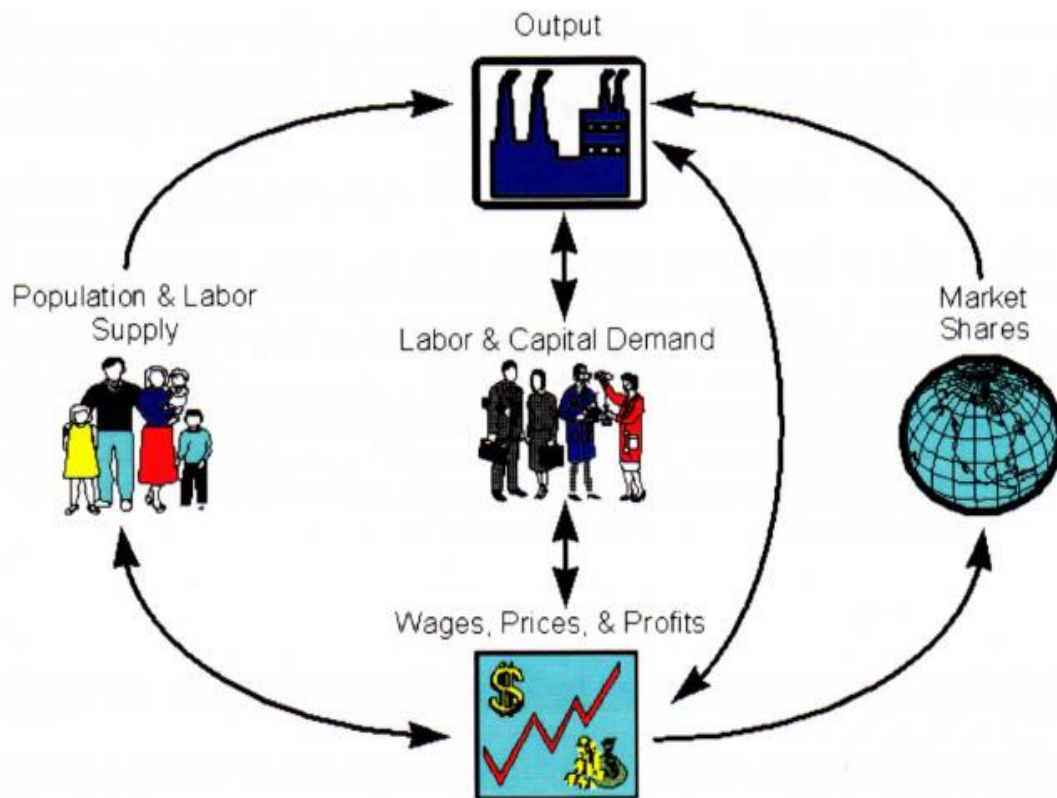
The model relies on common economic assumptions: firms maximize profits and households maximize utility. In addition to Input-Output relationships, the model contains many equations that describe the structure of the economy in mathematically and statistical terms. Those equations belong to any of five major components or blocks: Output, Population & Labor

²² The surrounding counties of New Jersey, Pennsylvania, Maryland, and Virginia interact within the model as some dismissed workers were or are resident in those states.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Supply, Labor and Capital Demand, Market Share, and Wages, Prices, & Profits. The figure below illustrates the interaction between the five blocks.

Figure 9 – Illustration of Block Interactions Within the REMI PI+ Model



Economic criteria define the equations within each block: business use labor, capital, and fuel as inputs to supply goods and services. Households and business provide inputs for production and demand goods and services. Equilibria in the different markets calculate wages, prices, and profits.

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

The REMI PI+ is a general equilibrium model with feedback, which means that it describes the economy as it changes over time: variations in population, demographics, and wages exert influence over the labor supply. Changes in today's labor supply also affect that supply in future years. Those adjustments are not instantaneous and occur gradually, instead of statistically jumping from one equilibrium to another. That characteristic is another of REMI's advantages versus Input-Output models.

The general equilibrium capacity of the model includes the multiplier effect through successive iterations and equilibria in other parts of the economy. Consequently, the multiplier effect is the cumulative impact of any change in the economy. As an example: a purchase of one dollar of retail sales increases construction in 28 cents plus sales in manufacturing in 30 cents plus sales in utilities. The summation of the different inputs in the dollar spent in retail could exceed that amount by several factors.

Figure 10 – How REMI Forecast the Effect of a Policy

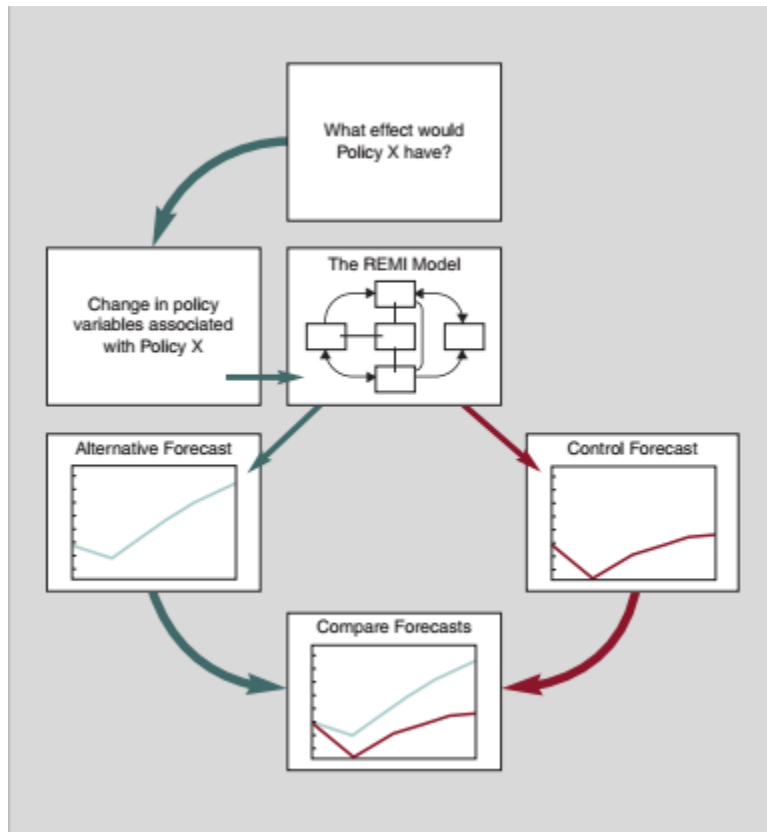


Figure 10 displays how REMI handles the calculations. REMI includes, by default, a Control Forecast. That forecast does not necessarily need to verify in the future as it acts only as a reference. When the policy modeler introduces a change in policy variables (input variables), the model simulates the results and stores them in the Alternative Forecast. Finally, REMI compares both the Control and Alternative forecasts, and the difference is the result of the change in Policy X.

In this report, we employ the REMI PI+ model to visualize and understand the economic impact of Corporation Downsize on the economy of New Castle County and the State of Delaware.

Additional Economic Impact Results

The REMI model generates a wide range of results. We already analyzed a summary of them in the section “The Economic Impact of Corporate Downsizing” above. Below, we include tables with simulation results for Output and Demand and Income that supplement the analysis of the Impact section.

Table 31 – Economic Impact of Corporate Downsizing on Output in New Castle County.

Category	Units	2017	2018	2017-22
Demand	Billions of Fixed (2012) Dollars	-4.783	-0.666	-5.219
Imports	Billions of Fixed (2012) Dollars	-2.476	-0.300	-2.801
Self-Supply	Billions of Fixed (2012) Dollars	-2.307	-0.366	-2.418
Exports	Billions of Fixed (2012) Dollars	-0.033	0.015	0.154
Output	Billions of Fixed (2012) Dollars	-4.800	-0.656	-5.029
Value Added	Billions of Fixed (2012) Dollars	-2.710	-0.409	-2.879

Table 18 – Economic Impact of Corporate Downsizing on Output in the State of Delaware.

Category	Units	2017	2018	2017-22
Demand	Billions of Fixed (2012) Dollars	-5.075	-0.75	-4.990
Imports	Billions of Fixed (2012) Dollars	-2.667	-0.347	-2.881
Self-Supply	Billions of Fixed (2012) Dollars	-2.421	-0.405	-2.124
Exports	Billions of Fixed (2012) Dollars	-0.120	-0.014	0.163
Output	Billions of Fixed (2012) Dollars	-4.963	-0.689	-4.660
Value Added	Billions of Fixed (2012) Dollars	-2.782	-0.421	-2.633

Some definitions:

Demand: The amount of goods and services demanded by the local region (imports plus self-supply).

Total Imports: The amount of goods and services produced in other regions in a multi-region model, the rest-of-nation region, and the rest of the world that are consumed locally.

Self Supply: The amount of local demand supplied locally.

Total Exports: The amount of local production exported out of the local region to destinations in other regions.

Output: The amount of production, including all intermediate goods purchased as well as value added (compensation and profit). Can also be thought of as sales or supply.

Value-Added: The gross output of an industry or a sector less its intermediate inputs; the contribution of an industry or sector to gross domestic product (GDP).

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Table 19 – Economic Impact of Corporate Downsizing on Income and Earnings – NCC.

Category	Units	2017	2018	2017-22
Total Earnings by Place of Work	Billions of Fixed (2012)	-3.260	-0.326	-3.286
Total Wages and Salaries	Billions of Fixed (2012)	-2.710	-0.253	-2.772
Supplements to Wages and Salaries	Billions of Fixed (2012)	-0.433	-0.059	-0.485
Proprietors' income with inventory valuation and capital consumption	Billions of Fixed (2012)	-0.117	-0.013	-0.026
Less: Contributions for Government Social Insurance	Billions of Fixed (2012)	-0.353	-0.039	-0.374
Plus: Adjustment for Residence	Billions of Fixed (2012)	0.978	0.171	0.972
Gross Inflow	Billions of Fixed (2012)	0.002	0.050	-0.022
Gross Outflow	Billions of Fixed (2012)	-0.975	-0.121	-0.991
Equals: Net Earnings by Place of Residence	Billions of Fixed (2012)	-1.929	-0.115	-1.939
Plus: Property Income	Billions of Fixed (2012)	-0.021	-0.003	-0.072
Personal Dividend Income	Billions of Fixed (2012)	-0.006	-0.001	-0.020
Plus: Personal Current Transfer Receipts	Billions of Fixed (2012)	0.012	0.007	-0.044
Equals: Personal Income	Billions of Fixed (2012)	-1.939	-0.111	-2.060
Less: Personal current taxes	Billions of Fixed (2012)	-0.268	-0.016	-0.276
Equals: Disposable personal income	Billions of Fixed (2012)	-1.671	-0.095	-1.785

Table 20 – Economic Impact of Corporate Downsizing on Income and Earnings – Delaware.

Category	Units	2017	2018	2017-22
Total Earnings by Place of Work	Billions of Fixed (2012)	-3.317	-0.342	-3.350
Total Wages and Salaries	Billions of Fixed (2012)	-2.746	-0.262	-2.814
Supplements to Wages and Salaries	Billions of Fixed (2012)	-0.444	-0.062	-0.501
Proprietors' income with inventory valuation and capital consumption	Billions of Fixed (2012)	-0.127	-0.017	-0.030
Less: Contributions for Government Social Insurance	Billions of Fixed (2012)	-0.360	-0.040	-0.383
Plus: Adjustment for Residence	Billions of Fixed (2012)	0.879	0.153	0.869
Gross Inflow	Billions of Fixed (2012)	-0.106	0.032	-0.141
Gross Outflow	Billions of Fixed (2012)	-0.984	-0.121	-1.006
Equals: Net Earnings by Place of Residence	Billions of Fixed (2012)	-2.078	-0.148	-2.097
Plus: Property Income	Billions of Fixed (2012)	-0.024	-0.004	-0.085
Personal Dividend Income	Billions of Fixed (2012)	-0.006	-0.001	-0.020
Plus: Personal Current Transfer Receipts	Billions of Fixed (2012)	0.014	0.007	-0.065
Equals: Personal Income	Billions of Fixed (2012)	-2.089	-0.145	-2.251
Less: Personal current taxes	Billions of Fixed (2012)	-0.291	-0.021	-0.305
Equals: Disposable personal income	Billions of Fixed (2012)	-1.797	-0.123	-1.948

Economic Impact of Corporate Downsizing on the Economy of the State of Delaware

Some Definitions:

Total Earnings by Place of Work: The sum of Earnings by Place of Work for private non-farm industries, state and local government, federal civilian, federal military, and farm sectors.

Total Wages and Salaries: The sum of Wages and Salaries for private non-farm industries, state and local government, federal civilian, federal military, and farm sectors.

Supplements to Wages and Salaries: Consists of employer contributions for employee pension and insurance funds and employer contributions for government social insurance.

Proprietors' Income: Current-production income of sole proprietorships, partnerships, and tax-exempt cooperatives. Excludes dividends, monetary interest received by the nonfinancial business, and rental income received by persons not primarily engaged in the real estate business.

Contributions for Government Social Insurance: Employer contributions for government social insurance as well as payments by employees and the self-employed

Adjustment for Residence: The net flow of the net labor earnings of interarea commuters. Personal income in a region is based on the residence of the income recipients.

Gross Inflow: The income of Employees who live in the local region and work in another.

Gross Outflow: The income of Employees who work in the local region and live in another.

Net Earnings by Place of Residence: Earnings by place of work plus an adjustment to convert earnings by place of work to a place-of-residence basis.

Property Income: Rent is the net income of persons from the rental of the real property plus the imputed net rental income of the owner-occupants of nonfarm dwellings plus the royalties received from patents, copyrights, and the right to natural resources.

Personal Dividend Income: Dividends consist of the payments in cash or other assets made by corporations located in the nation or abroad to persons who are residents of the nation. It excludes that portion of dividends paid by mutual funds related to capital gains distributions.

Personal Current Transfer Receipts: The sum of government social benefits and net current transfer receipts from businesses (pensions.)

Personal Income: Income received by persons from all sources.

Personal Current Taxes: Includes taxes paid by persons on income, including realized net capital gains, and on personal property.

Disposable Personal Income: Total after-tax income received by persons; it is the income available to persons for spending or saving.