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End of the Line:
Reassembling the Legacy of NUMMI, The American Middle Class in the Era of
Globalization and Recession

By Joshua Nathan Troncoso

A Dissertation submitted in partial satisfaction of the requirements for the degree of

Doctor of Philosophy In Ethnic Studies

In the Graduate Division

Of the

University of California, Berkeley

Committee in Charge:

Professor Harley Shaiken, Co-Chair & Professor Michael Omi, Co-Chair
Professor Khatharya Um
Professor Richard Walker

Spring 2012

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Abstract
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Globalization and Recession

By

Joshua Nathan Troncoso

The Fremont California-based NUMMI plant was long considered a model of high-skill, high-productivity manufacturing, as the facility produced some of the highest quality vehicles in the world for almost three decades until its closure in 2010. I argue that NUMMI's success was due to its collective bargaining agreement because it leveraged workers' fullest effort and skill because it ensured them job security, a living wage, and protected them from capricious management. The presence of a union and a collective bargaining agreement mandated that workers avoid disputes with management and collaborate with managers on streamlining production in exchange for compensation and related guarantees and ensured smooth, consistent and high quality work.

Some interpreted NUMMI's closure in 2010 as a referendum on union-supported wages, health care benefits and pensions at General Motors. My research shows that General Motors' failure was due primarily to financial problems, poor managerial decisions, rises in health care costs, undesirable product lineups and overinvestment in trucks and SUV's. General Motors also played a conspicuous role in the financial meltdown through its subsidiaries. General Motors Acceptance Corporation (GMAC) financed hundreds of billions of dollars in mortgage-based assets of suspect credit quality that helped create this multi-trillion dollar mortgage-backed asset market that collapsed in the global meltdown of the financial sector in 2008.

I argue that NUMMI and case studies from other automotive plants show that, despite a recession and global competition, lowering the wages of American workers and slashing their benefits undermines key sources of American competitive strength and represents the incorrect policy posture for the American economy.

For Nanny and Pops

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I also have to thank Khatharya Um. I'll never forget the confidence she has always expressed both in my work and in me and it's my obligation to pay that forward. I also want to recognize Professor Alex Saragoza and Professor Catherine Ceniza Choy. It was truly a pleasure to work with both of them as a Graduate Student Instructor. I could not finish my acknowledgements without thanking Professor Richard Walker (Walker TALKS!) for being a diligent, demanding and excellent editor.

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“But these men are your brothers—your lost, younger brothers. And if the word integration means anything, this is what it means: that we, with love, shall force our brothers to see themselves as they are, to cease fleeing from reality and begin to change it. For this is your home, my friend, do not be driven from it; great men have done great things here, and will again, and we can make America what America must become. It will be hard, James, but you come from sturdy, peasant stock, men who picked cotton and dammed rivers and built railroads, and in the teeth of the most terrifying odds, achieved an unassailable and monumental dignity. You come from a long line of poets, some of the greatest poets since Homer. One of them said, ‘The very time I thought I was lost, my dungeon shook and my chains fell off’”.

-James Baldwin,
“Letter to my Nephew” *The Fire Next Time*.

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THE HEARTBEAT OF AMERICA: GLOBALIZATION, RECESSION AND THE FLAT LINING OF THE AMERICAN AUTO WORKER

On December 19, 2008, with the global financial markets in turmoil and the Detroit automakers on the verge of bankruptcy, then-President George W. Bush issued an executive order authorizing the Treasury Department to use the Troubled Asset Relief Program's ("TARP") to aid any company it deemed necessary. Under this new policy, the Treasury Department extended several billion dollars in TARP funds to two of the nation's "Big Three" automakers, General Motors and Chrysler, who were at risk of failure. This expansion of TARP was dramatic because TARP was originally designed to assist financial institutions to maintain liquidity and solvency as they experienced unprecedented losses. Rescuing American manufacturing companies like the large automakers was not part of Congress' original intent when it approved the TARP program. But, as it turned out, this broadened mandate was instrumental in preserving the two struggling auto companies during the most severe and uncertain moments in the downturn. According to Steven Rattner, head of President Obama's auto task force, the failure of Bear Stearns in March of 2008 and Lehman Brothers in October turned quiet talks with G.M. and Chrysler into an immediate national priority.¹ Armed with new authority, then-Treasury Secretary Henry Paulson moved swiftly, lending General Motors and its subsidiary General Motors Acceptance Corporation a total of \$19.4 billion dollars, hoping that infusing them with cash would keep the automakers from going under until a longer restructuring plan could be negotiated.^{2,3} In exchange for protecting the companies from immediate insolvency, the Treasury Department retained large equity ownership stakes in both companies.

Yet, even this robust aid could not forestall decades of decline and losses at General Motors. On June 9, 2009 General Motors, once the world's largest automaker, filed for bankruptcy protection. In August 2009, General Motors announced its intent to sell several of its divisions, including Saab, Hummer and Land Rover, as well as the discontinuance of other models, including the Pontiac Vibe, as part of its bankruptcy restructuring. Given that the Vibe was being manufactured at New United Motor Manufacturing, Inc. ("NUMMI"), the announcement also placed the future of one of G.M.'s best plants (operated in a unique partnership with Toyota) on precarious footing.

As G.M.'s only remaining plant West of the Mississippi, NUMMI was unique from other G.M. facilities as it operated under its own collective bargaining agreement and, for several years, was the only G.M. plant using its particular high-performance work system. Some industry observers categorized NUMMI as one of G.M.'s higher cost plants, citing Northern California's comparatively high cost of living, fuel, electricity and insurance, making it an ostensibly logical candidate for shuttering.⁴ But, despite being more costly than other plants, NUMMI was one of the most efficient manufacturing facilities in G.M. and

¹ Rattner, Steven. *Overhaul: An Insider's Account of the Obama Administration's Emergency Rescue of the Auto Industry*. Houghton Mifflin. Boston, New York. 2010 Kindle edition Location 585

² *Ibid.*, Location 561

³ Cooney, Stephen, James M. Bickley, Hinda Chaikind, Carol A. Pettit, Patrick Purcell, Carol Rapaport, and Gary Shorter, 2009, "U.S. motor vehicle industry: Federal financial assistance and restructuring," CRS Report for Congress, Congressional Research Service, No. R40003, March 31.

⁴ Waurzyniak, Patrick. "LEAN at NUMMI: Here's how lean manufacturing improved this Toyota-G.M. joint venture's automotive manufacturing efficiency". *Automotive Manufacturing*. September 2005. Page 73.

Toyota's portfolios. The plant produced vehicles that consistently topped each of their respective classes in quality, most recently producing the Toyota Corolla, Pontiac Vibe and Toyota Tacoma.⁵ Despite a long and successful track record, General Motors discontinued its Pontiac division as part of its corporate restructuring, effectively ending twenty-six years of involvement at the NUMMI plant. Several months after G.M. announced its withdrawal from the joint venture at NUMMI, Toyota made a similar move, citing the region's high costs, their own excess capacity and sharply declining sales stemming from the 2008 financial meltdown.

Ever since Toyota officially closed the doors on NUMMI, the closure has been interpreted as support for a well-established narrative about organized labor and the American manufacturing market—that America, once the world's pre-eminent manufacturer, has lost its edge in manufacturing to competitors in Europe, Japan and Mexico. Under this narrative, organized labor's demands for higher wages and unreasonable health care and retirement benefits have accelerated America's manufacturing decline by bloating the costs of manufacturing in the United States relative to overseas production sites. But the argument that union-driven costs that hampered American innovation and efficiency in manufacturing fails to account for NUMMI, which provided the counterpoint for 26 years that an American plant with an organized labor force can competitively produce high quality products.

In the aftermath of General Motor's bankruptcy, commentaries in the trade press sharply criticized management, arguing that the company's 2009 failure was the coda to a series of bad decisions and adverse events over the previous several decades. A June 2009 review in *The Economist* encapsulates the dominant view of G.M.: a company that manufactured poor vehicles, made more cars and trucks than they could sell, and yielded to economically irrational union demands for compensation and benefits, resulting in balance sheets larded with tens of billions of dollars of debt and as much in unfunded, out-year liabilities. According to *The Economist*, G.M. and the United Auto Workers ignored the realities of an increasingly competitive global economy for too long and that the company's long-term survival depended on re-organizing its debt and shrinking its overall size.⁶

NUMMI stands apart from this narrative. The story of NUMMI's journey from a shuttered General Motors facility in 1984 to a world-class manufacturing plant in 1986 to its final closure in 2010 precisely centers questions that scholars of labor and the national economy are asking right now: If manufacturing still matters to the American economy, can these industries remain globally competitive? Are unions helping or hurting American industry? Popular neoliberal perspectives maintain that manufacturing in America is dead and that unions and globalization put the nails in its coffin. This reasoning presumes that weaker unions and lower pay for American workers is the correct prescription for healing the American economy and its manufacturing sector.

My study of NUMMI offers a critical counter-point to this argument. The Fremont California-based NUMMI plant was long considered a model of high-skill, high-productivity manufacturing, as the facility produced some of the highest quality vehicles in the world for almost three decades until its closure in 2010. Previous scholars who have considered NUMMI have posited various reasons for its success. Some, most notably Paul Adler, pegged the plant's success to its Japanese-derived work system. Others have pointed to its workforce's fear of unemployment. And still others argue that NUMMI was a success

⁵ Ibid., Page 74.

⁶ Anonymous. "The Decline and Fall of General Motors: Detroitosaurus wrecks: The Lessons for America and the car industry from the biggest industrial collapse ever". *The Economist*. June 6th 2009. Page 52.

because management and workers collaborated out of mutual self-interest. But each of these arguments undervalues the singular factor that binds all of them together: organized labor. I argue that NUMMI was successful primarily owing to the plant's unique collective bargaining agreement leveraged workers' fullest effort and skill because it ensured them job security, a living wage, and protecting them from capricious management. In like manner, the presence of a union and a collective bargaining agreement contractually mandated that workers avoid disputes with management, avoid strikes and collaborate with managers on streamlining production in exchange for compensation and related guarantees. The contractual obligations and assurances for both management and workers at NUMMI ensured smooth, consistent and high quality work. This new interpretation of NUMMI's success shifts the debates over the long-term importance of the plant away from pre-formed narratives of a once-thriving manufacturing facility that happened to be unionized and towards a story of an auto plant that was successful *because* it was unionized, *not in spite of it*.

Formerly known as General Motors Fremont until 1984, NUMMI's workforce and management left behind a storied history of antagonism and coercion in favor of a more efficient form of work organization and cooperative industrial relations. Paul Adler wrote several articles on NUMMI and has come to reflect the general consensus about the plant's work organization: that NUMMI's unionized, high-performance work system (HPWS) systematized collaboration and high wages and represented the best way forward for a globally competitive American manufacturing sector.⁷⁸ Production at NUMMI needed to be fast, precise and, above all, replicated tens of thousands of times a day without error. These goals required that workers be skilled, disciplined and open to collaboration with management.⁹ As opposed to discrete areas of specialization, all workers at NUMMI possessed several areas of specialization and received on-going training.

Management at NUMMI had high expectations for its workforce in terms of responsibilities, but complemented their efforts with policies that reinforced a sense of collaboration and mutual dependence.¹⁰ Toyota's production system is more efficient than the one used under G.M. Fremont, which was fairly common knowledge even in 1984. Yet, what sets NUMMI apart from other plants using similar work organization, is the way management tried, with measured success, to integrate everyday workers into the design, control and execution of their own jobs. According to Adler, management enrolled workers in the management decision-making process at NUMMI, enhancing productivity overall by giving workers greater discretion and responsibility.

NUMMI's success, however, cannot be solely attributed to its work system and its collective bargaining agreement. Rather, its longevity and success was also contingent on the

⁷ Adler, P. S. (1993). "Time and Motion Regained." *Harvard Business Review* 71(1): 97-108.

⁸ I am using Rutgers economist Eileen Appelbaum's definition of the phrase "high performance work system", referring to a system of, usually mass production that is in her words, "...organized to permit front-line workers to participate in the decisions that alter organizational routines". In other words, re-designing production in ways that promote active skill development and the participation of line workers in gathering, processing and acting on information gathered while on the line to increase efficiencies For more please see: Appelbaum, E. (2000). *Manufacturing Advantage : why high-performance work systems pay off*. Ithaca, Cornell University Press. Page 3-5.

⁹ Adler, P. S. B. G., David Levine (1999). "Flexibility Versus Efficiency? A Case Study of Model Changeovers in Toyota's Production System." *Organizational Science* 10(1): 43-68.

¹⁰ Adler, P. S. R. E. C. (1993). "Designed for Learning: A Tale of Two Auto Plants." *Sloan Management Review* 34(3): 85-94.

particular conditions under which it operated. The presence of organized labor alone is not sufficient to ensure the success of the facility or the competitiveness of American industry. The NUMMI example demonstrates, first, the need for a strong and involved union. Second, high-performance facilities like NUMMI require the logistical, political and infrastructural support of the parent company. As chapter three highlights, NUMMI was one of the few successful experiments in high performance manufacturing because of the continued support of General Motors and Toyota. Third, the parent company themselves must be financially sound. As I note in chapter four, General Motors strayed from its primary auto manufacturing business in 2000 as its finance arm expanded—an expansion that created the outside indebtedness and soured investments that would help push the company into bankruptcy and eventually claim NUMMI as a casualty.

Questions still remain about what G.M. learned from its operation of NUMMI, especially in terms of how to improve productivity and the quality of its vehicles. The answer emerging from the literature and evidence forwards a familiar conclusion: NUMMI was an important model of how to run a lean/flexible work system, but the indifference of top management kept General Motors from applying those insights on supplier organization, inventory management and workforce development elsewhere for well over a decade.

Both General Motors and Toyota withdrew from NUMMI in early 2010, laying off 5,500 workers and jeopardizing the livelihoods of roughly 20,000 others working in NUMMI's large network of suppliers and service companies.¹¹ Some interpreted NUMMI's closure as a referendum on union-supported wages, health care benefits and pensions at General Motors, linking the 2009 bankruptcy (and bailout) of G.M. and its health care and pension expenditures to a broader public rejection of American organized labor.¹² But, despite a more palpable hostility to organized labor in the United States since the 2008 financial crisis, my research shows that the collapse of General Motors was due primarily to poor managerial decisions, unanticipated rises in health care costs, outdated and undesirable product lineups, overinvestment in trucks and SUV's, and, finally, a re-design process hampered by a bloated corporate structure that was resistant to change.

General Motors not only had long-standing structural problems, but played a remarkably conspicuous role in the financial meltdown through its subsidiaries. General Motors Acceptance Corporation (GMAC), for example, financed hundreds of billions of dollars in mortgage-based assets of suspect credit quality. The creation and sale of these highly leveraged assets formed the basis of even larger, riskier assets that were re-packaged, sold, insured and speculated on. Eventually, this multi-trillion dollar mortgage-backed asset market collapsed in the global meltdown of the financial sector in 2008.

IS MANUFACTURING IN THE UNITED STATES STILL REALISTIC?

The frustration and blame analysts directed at the United Auto Workers in the wake of General Motors' bankruptcy is the most recent iteration of a decades-long debate over the impossibility of maintaining middle-class employment with a deeply recessed domestic market and a global economy that is becoming more competitive and sophisticated. The

¹¹ Shaiken, Harley. "Commitment is a Two-Way Street: Toyota, California and NUMMI". White Paper: Toyota NUMMI Blue Ribbon Commission. March 3rd, 2010.

¹² Saad, Lydia. "Labor Unions See Sharp Slide in U.S. Public Support". September 3, 2009. Gallup Press. Gallup.com.

importance of NUMMI is found not just in its role as a large regional employer, but as an example of the durability and importance of unionized, American manufacturing to middle-class employment and the vibrancy of the broader economy. NUMMI was a facility that operated at the intersection of debates on the waning influence of organized labor, economic globalization and, most recently, the 2008 financial crisis.

I argue that NUMMI and case studies from other automotive plants show that, despite a recession and global competition, lowering the wages of American workers and slashing their benefits undermines key sources of American competitive strength and represents the incorrect policy posture for the American economy. This is a critical debate in the country right now. The United States has been losing unionized manufacturing work for more than four decades. Consumer debt for the middle-class is at a 100-year high, while middle-class incomes have dropped to 30-year lows. Choosing the wrong path at this juncture will do long-term harm to the American middle class and will hinder economic recovery.

According to Berkeley economist Emmanuel Saez, income inequality in the United States has swelled since 1970. The top 1% of income earners in the United States more than doubled their share of the national income in less than thirty years, going from 5% in 1970 to 11% in 1998, while the earned incomes of the bottom 90% of Americans in 2008 were lower than they were thirty eight years prior in 1970.¹³ Narratives of underemployment, declining unionization and widening income inequality in the United States imbue NUMMI's story with a greater significance, making it a case study in the domestic and global stresses facing America's industry and its middle class in the early 21st century.¹⁴

Susan Helper, a professor of economics at Case Western University, maintains that American heavy industry and plants like NUMMI employ millions of Americans and are sources of industrial innovation for the broader economy.¹⁵ She argues, therefore, that the United States should adopt a coherent national industrial policy in a manner similar to most of its competitors in Western Europe and East Asia. She also argues that low-cost competition, prolonged American trade deficits, and poor infrastructure cost America 16% of its manufacturing jobs between 2000 and 2003. According to Helper, high-quality exports from wealthier (and lower income) nations and greater trade volumes in low cost goods from countries like China are pressuring the wages and profitability of American manufacturing, leading to loss of employment and widening income inequality. In response to these pressures, she devotes much of her analysis to linking America's continued global competitiveness to a coordinated set of federal policies that create a market for renewable energy and link the associated new work to U.S. manufacturing sectors. While my dissertation is in direct conversation with Helper's arguments, the connection she makes between international trade, declining employment and income inequality in the United States is hotly contested.

Eileen Applebaum, an economist at Rutgers University, has written extensively about how technologically sophisticated competition from lower income nations, loosening regulations and changes in work organization are placing tremendous downward pressure on

¹³ Saez, Emmanuel. "Income Inequality in the United States 1913-1998". *The Quarterly Journal of Economics*. MIT Press. Volume CXVIII, Issue 1. February 2003. Page 31.

¹⁴ Economic Policy Institute. "When Income Grows, Who Gains?" *State of Working America*. <http://stateofworkingamerica.org/who-gains/#/?start=1970&end=2008>

¹⁵ Helper, Susan. "Renewing U.S. Manufacturing: Promoting a High Road Strategy". Economic Policy Institute. Briefing Paper #212. February, 2008.

production costs here in the United States.¹⁶ Joining issue with Helper, Applebaum cites both qualitative and quantitative evidence supporting the efficiency and competitiveness of high wage, high productivity work systems. In her analyses, advanced industrial economies have reached the competitive limits of hyper-specialized, low wage production systems due in part to competition from developing economies. American manufacturing industries, according to her analysis, must focus their efforts not on cost, but on product quality and variety, re-designing their production process and upgrading the skill-bases of their employees.¹⁷

Robert Reich, reflecting on the legacy of the North American Free Trade Agreement, acknowledges that globalization and trade may be harming industrial employment in the United States but chooses to reframe the relationship between manufacturing employment, the American middle class and globalization in a different way than Applebaum or Helper. After citing employment statistics out of Ohio before and after NAFTA, he sees trade as trimming at the margins of industrial work rather than being the primary mover driving change in the American economy, attributing the majority of the job losses to gains in efficiency and automation, not global competition.¹⁸ Reich's point in 2008 bears a strong resemblance to the argument he made in his 1991 book *The Work of Nations*, in which he sees technological change (and to a lesser extent trade) necessitating changes in the American workforce. Having pointed to the permanent decline of manufacturing, Reich's earlier text heralds a new generation of jobs where the future of American competitiveness depends on many becoming "symbolic analysts," or managers of technologically and information infused work processes.¹⁹ Over time, Reich's phrase has been unmoored from its original meaning that global trade and information technology will continue changing the nature of work in ways requiring workers to acquire a broader set of cognitive skills and to rely more often on their critical judgment in production. Though he certainly favors compensating those on the losing end of trade and automation-related employment losses, he writes that "The [Democrats] should not be re-debating NAFTA. They should be debating how to help Americans adapt to a new economy in which no job is safe". Reich implies that trade and globalization will continue altering American labor markets and on the whole has been a net positive for the American economy. The solution to blue collar employment losses, therefore, is not a national industrial policy alluded to by Helper, but compensating those most affected by trade and invest in education and training for structurally displaced workers.

Reich's sentiment is that blue-collar manufacturing and its workers in the United States are caught between the scissors of intense global competition and broader industrial efficiency gains, as competitors in Europe and East Asia continue to lead U.S. based automakers in quality, efficiency and price and as the industry becomes less reliant on physical labor. It is important to examine the theoretical perspectives and empirical evidence that lead respected scholars like Reich to suggest that plant closures such as NUMMI are an

¹⁶ Applebaum, Eileen *Low Wage America: How Employers are Reshaping Opportunity in the Workplace*. Russell Sage Foundation Publications. July, 2006.

¹⁷ Applebaum is clearly drawing from Piore and Sable's theory of "flexible specialization", where mass production dialectically gives way to a production system characterized by stable, cooperative relationships between capitalists and their multi-skilled workers, shielding industries from southern cost competition. Michael J. Piore and Charles F. Sabel, *The Second Industrial Divide: Possibilities for Prosperity* (New York: Basic Books, 1984).

¹⁸ Reich, Robert. "Hillary and Barack, Afta Nafta". February, 29th, 2008. Robertreich.org.

¹⁹ Reich, Robert. *The Work of Nations: Preparing Ourselves for the 21st Century Capitalism*. Vintage Books, February 1991.

unavoidable part of the growth and transition of advanced industrial economies. In February 2012, Reich criticized both the Obama administration and the field of GOP Presidential hopefuls for misleadingly highlighting the resurgence in American manufacturing retorting, “American manufacturing won’t be coming back”. He sees the political championing of resurgent blue-collar work in America as a red herring that elides deeper, more structural concerns, writing that, “Bringing back manufacturing is not the real challenge [facing the American economy] anyway. It is creating good jobs for the majority of Americans who lack four year college degrees”.²⁰ Reich is reiterating a point he’s made before, that global competition and greater labor efficiency in manufacturing will ensure that American heavy industry will not and cannot be the bulwark for the middle class in the way it used to be in the so-called “golden era” of the mid 20th century. I agree with Reich when he identifies the declining influence of organized labor as the more important problem pressuring the living standards of the middle class but I argue that manufacturing remains critical aspect to this discussion.

Without going into an unnecessary level of detail, Reich’s arguments are underpinned by several strands of economic thought maintaining that all industries, including heavy manufacturing, will unavoidably contract in size and economic importance as production becomes more labor efficient and global competition grows in scale and sophistication. Key to this view is that if industries fail it frees capital and labor to pursue higher value-added activities, thus positing industrial contraction and employment loss as the bitter but necessary antecedent to innovation, productivity and ultimately macroeconomic growth. If productivity at the aggregate level is a measurement of the total value of all goods and services produced in an economy (GDP) relative to the total number of workers and their total compensation, it makes sense, then, that as large industrial sectors of the economy produce more value with fewer people, it will produce a net gain for national productivity, regardless of whether those efficiency gains are trade related or due to automation. The broader implication being that it is inefficient for politicians or policy makers to shield industrial sectors such as auto manufacturing from global competition or from their own mistakes, as it will merely distort labor markets and delay the inevitable.

Data from the Economic Policy Institute complicates Reich’s claims that manufacturing, bracketed apart from organized labor, is not critical to the future of the American middle class. According to Lawrence Mishel, Jared Bernstein and Heidi Sheirholz, there is evidence suggesting that globalization has fundamentally altered aspects of the economy in ways that are likely to be damaging and permanent. They argue that as American trade patterns shifted away from high income nations to lower wage economies at the end of the 1990s and U.S. trade deficits continued to widen, imports from lower wage economies have reduced American manufacturing employment for intermediate goods. They are making the case that direct competition with lower wage economies affects American workers in a number of registers other than shifts in relative prices or efficiency as postulated by neo-Ricardian trade theories, arguing that direct investment in these countries increases global manufacturing capacity with lower wage competition, driving down global commodity prices and eroding investment in the U.S. manufacturing base.²¹ Perhaps their most persuasive point is what they refer to as the “threat effect,” or how the realistic possibility of

²⁰ Reich, Robert. “Manufacturing Illusions” Huffington Post, February 17, 2012. Huffingtonpost.com

²¹ Mishel, Lawrence. Jared Bernstein. Heidi Sheirholz. *The State of Working America 2008/9*. Cornell University Press, Ithaca New York. 2009. Page 184.

moving production overseas continues to drive American wages down. According to Mishel and his co-authors trade and globalization have had neither temporary nor minor effects on blue-collar work as Reich suggests; rather trade has in their words "...accelerated the long-term decline in manufacturing", costing America more than 4 million jobs since 1979.²²

Dani Rodrik, an economist at Harvard, is one among several mainstream academics who are rethinking the terms of how America is engaging with the global economy, discrediting those framing market interactions and outcomes as a black and white, zero-sum fashions. As part of his broader argument for expanding state regulatory regimes to manage and oversee global markets, Rodrik does not agree that losing high skilled manufacturing work in exchange for less expensive consumer items should be considered a net gain for the American economy. He writes, "The costs we face as individual consumers and producers are not always relevant costs from the perspective of nations as a whole".²³ Rodrik is towing a line that is gaining traction in academic circles, that we should not uncritically accept that certain industries naturally thrive while others wither. Rodrik distinguishes between market outcomes generally and what's otherwise a politically directed outcome rather than positing all market outcomes as natural or innate. He urges economists and the general public to evaluate any potential or realized gains from trade against the scale of the redistribution, or what he refers to as the "redistribution-to-efficiency-gains-ratio", to determine whether losing high skill manufacturing in return for less expensive consumer goods is actually a net gain for the American economy.²⁴

The idea that economic thinkers should not treat all industries as abstract, interchangeable categories dovetails neatly with an argument by Ha-Joon Chang. A Cambridge trained economist, Chang cautions against assumptions of "perfect factor mobility", or that as markets expand and contract assets and resources will seamlessly move out of trade-affected sectors and into sectors that are more efficient and globally competitive.²⁵ While theoretically important, the assumption that assets are somehow abstract and interchangeable strains credulity: is it realistic to assume that a die press used in automotive manufacturing will somehow be used more efficiently by another industry? Not only do asset and resources not easily translate from one sector to another but, according to Chang, the mainstream trade models do not account for the long-term development costs are of losing certain assets.²⁶

In February 2008, Robert E. Scott, another economist at the Economic Policy Institute, argued that manufacturing remains a critical part of the American economy despite decades of losses to both trade and automation as manufacturing employs slightly over 10% of the American workforce, contributes \$1.6 trillion dollars or roughly 12% of American GDP and alone accounted for 64% of the value of American exports in 2006.²⁷ Perhaps most important is that American manufacturing still hires more workers without college degrees and pays those workers higher wages than any other industry in this country, making it the largest

²² Ibid., Page 191

²³ Rodrik, Dani *The Globalization Paradox: Democracy and the Future of the World Economy*. Norton & Company, New York, New York. Kindle Edition, 2011. Location 1019.

²⁴ Ibid., Location 1087

²⁵ Chang, Ha-Joon. *Bad Samaritans: The Myth of Free Trade and the Secret History of Capitalism*. Bloomsbury Press, New York, New York. 2008. Page 71.

²⁶ Ibid., Page 73.

²⁷ Robert Lee Scott, "The Importance of Manufacturing: Key to Recovery in the States and the Nation," in Economic Policy Institute Briefing Paper (Economic Policy Institute, 2008).

bastion of blue collar, middle class work in this country. In addition, American manufacturing remains a major source of national productivity growth, with increasingly integrated computing capital fueling surges in labor productivity slightly less than 6% per year in the more sophisticated manufacturing industries and 2.6% productivity growth over manufacturing industries as a whole between 1990 and 1996.²⁸ Manufacturing plays an important role in the American economy, but the claim that strains credulity most is that automation is the primary factor responsible for declining manufacturing employment and not globalization or deregulation, or some combination thereof.

A question rising from this school of thought is whether shifting to efficient and flexible mass production means we have transcended Fordism and shielded our industries from global competition. The answer remains: not necessarily. While the literature here is somewhat mixed, there's enough evidence suggesting that upgrading American manufacturing and its workers does not necessarily guarantee immunity from globalization nor does it necessarily mean that Fordism is dead because workers are better paid, more secure, have broader skills sets and have more input into production than before. Rather, it is more accurate that moving toward flexible production methods makes American manufacturing less exposed to international competition and more likely that workers will be higher paid and enjoy more job security. These policies are the baseline adjustments American firms must make to remain marginally competitive rather than durable solutions.

Evidence from NUMMI undermines fatalistic theory that advanced manufacturing based in the United States has been consigned to the trash bin of economic history. It would be easy to place NUMMI in one of the pre-formed explanations, such as those espoused by Appelbaum, that it used a flexible, multi-skilled workforce and promoted innovation and efficiency at a level of sophistication that cannot be replicated elsewhere in the world. A more comprehensive analysis of NUMMI's successes should focus instead on a variable that seems to have gone overlooked, organized labor. The fact NUMMI's workforce is unionized is not just a footnote punctuating what has turned out to be the rather tragic ending to the story of this plant; on the contrary, organized labor was a crucial component of the plant's success. Though it is difficult to draw definitive conclusions, empirical evidence suggests that the core features of NUMMI's system, high wages, low turnover, collaboration and integration are positively associated with high productivity and are reinforced by the presence of organized labor.

The notion that unions under the right circumstances can reduce costs and enhance competitiveness is not merely a contrarian reaction to rising waves of anti-unionism during the 2008-2011 economic downturn. Thus, it is important to document the major factors that account for G.M.'s decline. While union-related health care and pension costs and lower-cost competition did have a hand in General Motors' decline, a more accurate analysis, one that highlights how decades of mismanagement, declining sales and a failed side-business as one of the most prolific mortgage financiers in American history, should place health care and pension costs in their proper context. In its car sales business, between 2000 and its bankruptcy in 2009, General Motors struggled with overcapacity, excess production volume and sagging sales. It is the constellation of these factors that largely explains their rapid accumulation of long-term debt, as management at G.M. waited until their truck sales in the United States were in permanent decline before adjusting their capacity and annual production

²⁸ Appelbaum, Eileen. *Manufacturing Advantage: Why High-Performance Work Systems Pay Off* Ithaca: Cornell University Press, 2000. Page 3.

volumes. As I detail in chapter 4, despite offering zero percent financing and thousands of dollars in incentives on every car and truck it sold, General Motors' sales were evaporating faster than they could adjust their annual production volumes and capacity. This combination of lavish incentives, declining sales, excess capacity and production volumes and rapidly ballooning health care costs proved to be quite the lethal combination.

METHODS

The complexity and evolving politics surrounding the plant during my research necessitated a certain methodological flexibility on my part, requiring me to use a triangulation of historiography, secondary analysis, and primary data and documents to complete my work. I relied on an assortment of primary data and qualitative sources, archival documents, academic and historical case studies, and other secondary sources.

In my more historical chapters (chapters 1 and 2), I draw from wealth of existing secondary evidence pertaining to the NUMMI plant as well as the broader academic literature relating to industrial employment and automotive manufacturing. As perhaps the most thoroughly studied manufacturing facility in the world, there is a sizeable and important secondary literature on NUMMI making it critical to lay out previous arguments in order to properly position my own. In addition, a re-consideration of some of the historical data and evidence related to the plant highlights important new interpretations of its development and working conditions since the early 1980s. There were people working at NUMMI who were present in 1984, but the acrimony and legal requirements surrounding the plant's closure in 2009 and 2010 made it infeasible to interview them, forcing me to rely instead on existing historical records and accounts.

In my chapters 3 and 4, where I investigate the bankruptcy of G.M. and the proliferation of NUMMI's work practices throughout G.M., I use a wide assortment of publicly available primary data to support my argument. I draw from General Motors' annual filings with the Securities and Exchange Commission, annual shareholder reports, press releases, internal memos and autobiographical publications of key officials. In addition, the United Auto Workers International and many of its local affiliates made many of their collective bargaining agreements and public production data available.

My analysis of the bankruptcy of General Motors is based on data compiled by the U.S. Bureau of Economic Analysis, the Federal Reserve System, the United States Treasury Department, the Federal Deposit Insurance Corporation, the United States Department of Labor and an assortment of Congressional reports. Finally, I relied throughout my research on raw automotive production data compiled leading industry analyst groups, including Harbour and Associates, Ward's Automotive and Automotive News, Moody's Investor Services and Deloitte Accounting.

ROADMAP

Chapter One of this study covers the historical and economic development of NUMMI, focusing on its metamorphosis from shuttered plant at the bottom of General Motors' internal quality and productivity rankings in 1984 to one of the most efficient high tech manufacturing facilities in the world. In addition to how and why Toyota, General Motors and the U.A.W. worked together to transform this plant, it is important to position NUMMI within larger debates over the benefits of production systems and contemporary

work environments. I am arguing that NUMMI's organizational emphasis on workers' skill development, giving them greater autonomy and forging collaborative working relationships was crucial to increasing the plant's efficiency. Given the Fremont plant's notoriety, its ability to not just adopt but excel at adopting Toyota's work organization in the 1980s was quite radical. It is important to note that despite NUMMI's innovative approach, the success of the facility depended on a number of broader factors inside the plant as well as the health of the parent company and the broader economy. In process of detailing this, I challenge sweeping arguments like those of Wellford Wilms who maintained that NUMMI foreshadowed broad changes in American industry.

Chapter Two examines new explanations for NUMMI's relative successes. Sorting through the dense literature on the plant, my analysis highlights the benefits of NUMMI's system of production and exposes exaggerations, both supportive and critical of the plant. I use neoclassical theories of efficiency wages, authored by George Akerlof, Larry Summers and Joseph Stiglitz, to reconsider the reasons for NUMMI's success that move beyond vague notions of "cooperation" to the role of organized labor. I examine both qualitative evidence and new theoretical approaches suggesting that organized labor reinforces confidence, trust, coordination, collaboration and individual effort, all of which were critical to the plant's long-term success. For example, Stiglitz, Akerlof and Shapiro mathematically modeled the common sense principle that you get better results when you pay employees more. According to them, above market-clearing wages maximize workers' utility and effort exerted on the job. The implicit argument is that higher wages and job security maximize the opportunities for workers as well as the penalties for poor performance.

While I believe their model is a useful way to begin understanding many of the linkages between wages and productivity, expanding our theoretical understanding will highlight the special role that organized labor performs in auto manufacturing and performed at NUMMI. High skilled manufacturing relies on on-going error correction, steady technical refinement and tight coordination between all phases of production. The presence of organized labor not only connects wages to productivity but also secures the kind of confidence in co-workers and trust in job security that allows workers to suggest changes necessary to operate these systems. But there are limitations to this argument. In my analysis, the presence of organized labor is a necessary element of industrial competitiveness but not sufficient to ensure it.

Chapter Three explores the specific lessons that grew from NUMMI's work organization and industrial relations and examines the extent to which General Motors diffused those lessons to other plants. Based on my research of case studies of General Motors' facilities in Van Nuys, California, Linden, New Jersey and G.M.'s Saturn affiliate in Spring Hill Tennessee, the company made efforts to diffuse new forms of work organization throughout the United States. But those efforts were hampered by resistance from local unions and local management, inconsistent levels of support from G.M. corporate, national resistance at the U.A.W., a lack of logistical support from various supplier companies. Put simply, General Motors tried to diffuse the lessons from NUMMI, but was not successful. There appear to be at least two competing narratives here: first, according to a 2005 study, NUMMI's operations were a critical part of General Motors' long-term efforts to restore the competitiveness of the company products, with high ranking officials within G.M. using NUMMI as a model to formulate the company's new "global manufacturing system". I agree that NUMMI played an important role in reforming work systems throughout General Motors,

yet there is a time lag between when NUMMI hit its stride in 1986 and the implementation of the Global Manufacturing System in stateside plants in the late 1990s. Not everyone, however, shares this perspective.

Case studies and official correspondence between the U.A.W. and G.M. do not support the assertion that General Motors began applying the lessons from NUMMI in a prompt manner. Rather, memos and agreements show that both parties were warming to the broad outlines of high performance work but the proposed changes were mild in character and were implemented at a glacial pace. Paul Ingrassia, a Pulitzer Prize-winning journalist who spent more than two decades covering the automotive industry, has excoriated both General Motors and the United Auto Workers for sabotaging all attempts to change the company's business model. Ingrassia argues that General Motors initiated several high performance overhauls through the 1980s and early 1990s, but failed to follow these experiments to the end. Nonetheless, it is inexact to argue that managers at G.M. were incompetent or that the U.A.W. resisted change at every step. In spite of Ingrassia's claims, these experiments failed for a number of reasons, blame for which can be spread widely.

There are not any pre-formed explanations for why experiments in Linden, Van Nuys, and Tennessee enjoyed only moderate success. Rather, G.M.'s overhaul efforts were fraught with technological and logistical difficulties as well as reticence at all levels of management at General Motors and the United Auto Workers. These case studies of General Motors' experiments in new forms of work organization show less that G.M. was purely incompetent or that the U.A.W. stifled innovation, but rather that successfully overhauling these massive and expensive manufacturing systems required roping together support from at least five different parties (UAW locals and the international and G.M. managers and corporate brass, plus parts suppliers) all of which had conflicting and changing demands. To say either G.M. or the United Auto Workers were at fault understates the politics, scope and enormous expense associated with overhauling a company as large as General Motors.

Chapter Four investigates various interpretations of NUMMI's closure. Did NUMMI fail as an experiment, or was the plant undone by a historic downturn in the global economy? There is mounting evidence supporting the argument that the plant was undone by investment overcapacity on the part of Toyota and General Motors, the sweeping forces of the global financial meltdown, and the competitive dynamics of the global economy not the union. Based on my analysis of thousands of pages primary documents including SEC filings and shareholder reports, I argue that while General Motors was accumulating tens of billions of dollars in unfunded pension and health care liabilities for its workers, GMAC was financing hundreds of billions of dollars in high-risk sub and non-prime mortgage backed assets. As one of the ten largest financial institutions in the world, GMAC accumulated too much debt relative to its assets to the point where it swallowed the economy, General Motors and NUMMI.

It is ironic, then, that a company so entangled in the mortgage meltdown used the fragile economy in 2009 as leverage to squeeze concessions from the United Auto Workers. First, G.M. insisted on maintaining the two-tiered wage system created in 2007 mandating that any new U.A.W. hires make 40% less than continuing workers with minimal health care benefits through 2015. Second, General Motors now has greater flexibility to hire/fire temporary employees who remain ineligible for any benefits and can move into entry-level positions only when space becomes available and after several months of probation. Third, G.M.'s chapter 11 filing allowed the company to substitute non-voting stock in the new

company in place of its previous cash obligations. Feeling it was too risky to hold these assets, the U.A.W. sold its non-voting shares in the “new G.M.”, forcing the union’s trust fund for employee health care to absorb a significant loss.

Finally, my research shows that the financial assistance of two Presidential administrations was actually several times more expensive than its official price tag suggests. It is important to place what the United Auto Workers gave up in General Motors’ bankruptcy in terms of compensation, working conditions and hiring in relation to the amount of public assistance General Motors received in 2008 and 2009. Officially, the Treasury Department lent G.M. and its subsidiaries a total of \$19.4 billion dollars, but that figure does not account for two subsequent bailouts that kept G.M. afloat. First, the Treasury Department used Fannie Mae and Freddie Mac to bolster the housing market, effectively keeping financial institutions solvent and operating by funneling hundreds of billions of dollars in risky mortgage assets into federal programs, then bailing out Fannie Mae and Freddie Mac separately. According to GMAC’s records, they sold more than \$100 billion dollars in mortgage-backed assets to the federal government, which was functionally their sole customer during these years. G.M.’s third bailout occurred when GMAC broke off from its parent company and reconstituted itself as a “commercial holding bank” and, again, accessed more TARP funds as the newly minted “Ally Financial”.

I conclude with the observation that there is evidence suggesting that G.M.’s modular Global Manufacturing System improved the company’s product quality and the efficiency of its manufacturing facilities. The lessons from NUMMI enabled G.M. to open manufacturing platforms in the Chinese market, perhaps the United State’s most important emerging competitor in manufacturing. The irony is that G.M.’s new production system, derived from NUMMI, allowed the company to open new high performance plants in eastern and southern China, bringing organized workers in the United States into close competitive alignment with Chinese workers. Few would have predicted twenty years ago that NUMMI would enable General Motors to install a high performance work system at Greenfield sites in a country where wages are a fraction of those in Northern Mexico, let alone the United States. As I detail below, emerging literature and statistics on the Chinese auto market show that high end luxury vehicles aren’t being merely assembled in China using imported parts, but greater percentages of these components and parts are being manufactured there, indicating a rapid rise in manufacturing skill. Going forward, the validity of my argument regarding the importance of high wage manufacturing hinges on how employment and wages are taking shape in Chinese labor markets.

**CHAPTER ONE:
NO PLANT LEFT BEHIND: THE INDUSTRIAL REFORMATION OF G.M. FREMONT**

Prior to its shutdown in 1982 and its re-opening in 1984, NUMMI was a plant bogged down by a workforce and management mired in inefficiency and acrimony. When G.M. shuttered it in 1982, its Fremont plant had absenteeism rates consistently in the mid 20% range while ranking in the bottom of G.M.'s internal rankings in productivity and quality. Not only did their workers produce less than their G.M. counterparts, what they did produce had statistically more defects than other plants industry-wide. Rampant substance abuse problems and a management that accumulated hundreds of union grievances accompanied G.M. Fremont's poor performance. When G.M. reopened the plant as a joint venture with Toyota in 1984, the difference in performance was nothing short of dramatic. In two years, the plant's productivity doubled its previous high, with some cycle times reduced by 25% and, according to Paul Adler, the plant overall was 40% more productive than other baseline domestic auto plants. In addition, absenteeism plummeted from the mid 20% range down to 3% with 9 out of 10 employees reporting high levels of job satisfaction.²⁹ As a crowning achievement for this once subpar facility destined for mothballing, in 1993 JD Power and Associates ranked trucks rolling off of NUMMI's line highest in initial quality.

As part of a joint venture between G.M. and Toyota, NUMMI adopted a Japanese derived high performance work system that is a refined variation of traditional mass production and relies primarily on a cross-skilled and highly participative workforce, minimal inventories and team-based production that runs on worker input to continuously streamline and coordinate production.³⁰ Though it certainly did not have a perfect record since it re-opened, NUMMI was widely considered the premiere example of a successful and profitable high performance work system that melds innovative worker/management cooperation with high wages, high productivity and worker satisfaction, all of which kept it on the leading edge of work organization.

When the plant re-opened as NUMMI in 1984 after its initial shuttering in 1982, it was readily apparent that Toyota's production system was significantly more efficient than the previous production regime. Additionally, Paul Adler's 1993 study of NUMMI showed that along with the more efficient production system then supplemented it with policies that integrated workers into decision-making positions and broadened their skills. This upbeat narrative of the plant centers on the bold and visionary attempts of the new management to integrate a rebellious workforce humbled by unemployment into the exacting requirements of Toyota's lean production system, whose thin margins for error and tough skill requirements

²⁹ Adler, Paul S. "Time and Motion Regained". Harvard Business Review, January-February 1993. pp. 97-108.

³⁰ Please see some of the more recent studies of NUMMI that reinforce this point, but do not directly address the production process: Inkpen, Andrew "Knowledge Transfer and International Joint-Ventures: The Case of NUMMI and General Motors". Strategic Management Journal. Volume 28, 2008. pp. 447-453. & Inkpen, Andrew, "Learning Through Alliances: General Motors and NUMMI". California Management Review. Vol. 47, No. 4. Summer 2005. pp. 114-136. & Rothenberg, Sandra. "Knowledge Content and Worker Participation in Environmental Management at NUMMI". Journal of Management Studies, Vol. 40, No. 7. November, 2003. pp.1783-1802.

compelled both parties to cooperate and trust in each other's professional competence, abilities and judgment.³¹

Appealing as this narrative sounds, the reality is more complicated and muddled. The less heroic, though more accurate version of events, recasts NUMMI as a plant whose noted strengths in productivity, skill development and cooperation stem less from enlightened management and the desperation of its forlorn workforce than from the requirements of the new production system and the strong involvement of organized labor. The change brought about by the joint-venture was prompted simultaneously by G.M. Fremont's low performance, its organizational problems and Toyota's political need to open production facilities in the United States.

According to Welford Wilms, NUMMI's transition from backwater G.M. plant to a premiere high tech facility in less than two years was extraordinary, but did not occur without acrimony and tension between the local union and NUMMI's new management. James Rinehart *et al.* imply that researchers were so enamored with the idea or fantasy of a successful high wage/productivity plant that they present sanitized accounts of the plant's history as well as its performance. Rinehart's criticism contrasts with Wilms' account of the facility and its culture prior to the lock-out in 1982, where his description of open-air use of drugs, alcohol and prostitution on company property reads more like the opening scenes of *Mad Max* than the day-to-day routines of a high tech manufacturing plant.³² Though he ultimately overreaches on the implications of his argument, it is clear that the old G.M. plant was in desperate need of change and furthermore, that the transition to the jointly operated company was contentious and difficult on many levels.

Many of Wilms' interviewees offer up revealing, though at moments, deeply disturbing, accounts of the sort of bacchanalian revelry that unfolded at the noon hour every day in the plant's parking lot.³³ Allegedly, the lot was transformed at lunch into a broken-glass lined bazaar where people sold everything from hand-made (and second hand) apparel and accessories to hard drugs and even human companionship. Alcohol abuse among G.M. Fremont's workers was rampant, with managers even tolerating drinking while working on the line on the condition that workers keep doing their jobs and maintain the movement of the line. Not only were workers often drinking on the job but marijuana was widely enjoyed in the parking lot on break as well as on the job but there were even scattered reports of workers reporting for work with firearms.³⁴ What was happening in the parking lot hinterlands cannot be disassociated with the relations within the plant, the U.A.W. local relished its national and rather ignominious reputation for militancy against General Motors and especially against their local managers. The work culture at G.M. Fremont was dysfunctional to the point where not only were workers reporting with beer, narcotics and guns, but they filed literally

³¹ Reich, C. B. M. (1989). "When Does union-management cooperation work? A Look at NUMMI and CM-Van Nuys." *California Management Review* 31(4): 26-44.

³² Wilms, Welford. *Restoring Prosperity: How Workers and Managers are Forging a New Culture of Cooperation*. Random House, New York Times publishing, NY. 1996.

³³ *Ibid.*, Page 204.

³⁴ "Episode 403: NUMMI". Frank Langfitt. Producer Nancy Updike. *This American Life*. National Public Radio, WEBZ, Chicago. Aired March 13, 2010.

thousands of formal union work grievances against management, who certainly shared culpability because their chief concern was primarily keeping the line moving.³⁵

As a result of its acrimonious relations within the plant, G.M.'s Fremont plant produced the fewest number of cars, relative to the number of workers employed of any G.M. plants and the cars that found their way off the line in one piece were among the lowest quality for General Motors globally. Quality and efficiency took a backseat to volume; in other words, keeping the line moving to meet the plant's price targets were the first priority, which for Wilms and others was symptomatic of larger, structural problems associated with mass production.³⁶

Toyota, on the other hand, had its own concerns that brought them to G.M.'s doorstep. Toyota's success in the North American market did not go unnoticed as the company faced congressional pressure to limit car imports, the Japanese company decided to increase its productive capacity in the United States. Not only would bringing more plants online within the United States likely keep Congress from raising tariffs, it would buffer Toyota against currency fluctuations. Toyota's predicament coincided nicely with the closure of G.M.'s plant that happened to be located in California, Toyota's largest market. It seemed like a perfect fit: an experienced workforce, a plant already in place and an amenable partner in G.M., but there were considerable unknowns.

For one thing, Toyota had to reverse decades of mistrust between General Motors and its local union in Fremont. As Wilms notes, hatred for General Motors not only ran deep, but carried a certain cache within the local, with political factions in the union indulging each other in games of one-upmanship, trying to see who hated G.M. more, who could sabotage their plans best and who could intimidate management the most. This national reputation for strident union militancy and, I would add, a healthy disregard for law and penchant for borderline nihilistic behavior, appears to have been a source of pride that needed to be protected, almost nurtured, rather than seen as a factor contributing to the plant's poor performance.

For example, as G.M. and Toyota were beginning talks with the union about a possible joint venture, the automakers hired William Usery, Jr. as a consultant and negotiator. Usery was not a disconnected, bureaucratic consultant; quite the contrary he was a figure of considerable prominence whose career ranged from grassroots union organizing to the highest levels of public service. A veteran of WWII, Usery was trained in the military as an underwater welder and after the war worked as a machinist in Pennsylvania, where he was pivotal in creating a union from the ground-up. In 1969, President Nixon appointed him Assistant Secretary of Labor. Eight years later in 1976, Nixon's dust successor Gerald Ford promoted Usery to the top labor position in the country. Given his experience, Usery appeared to be a solid choice to broker an agreement between the local and the companies. It was one of Usery's early responsibilities to address local 2244 and convey some of the apprehensions Toyota's management was having over opening this new plant and hiring back some of the UAW workers. In one meeting, Usery was assaulted by a local official who threatened to "...punch [Usery] in the face..." for simply telling them that Toyota's management felt that the former G.M. workers were not putting in their full effort on the

³⁵ "Episode 403: NUMMI". Frank Langfitt. Producer Nancy Updike. *This American Life*. National Public Radio, WEBZ, Chicago. Aired March 13, 2010.

³⁶ Wilms, Welford. *Restoring Prosperity: How Workers and Managers are Forging a New Culture of Cooperation*. Random House, New York Times publishing, NY. 1996. Page ??

job.³⁷ This incident demonstrates the level of tension involved as the union, G.M. and Toyota moved forward on plans to re-open the Fremont plant. It also runs up against the interpretation forwarded by Lowell Turner, who argues that the year and a half shutdown made a defiant workforce unusually compliant. Saying that the higher level of cooperation was more the product of fear than the new high performance work system that Toyota used.

The joint venture went forward notwithstanding Toyota's misgivings and the U.A.W.'s mistrust. But cooperation at NUMMI was not created overnight. Rather the process was fraught with tension, conflict and, most importantly, compromise. The local union, for its part, had to ease its combative posturing while Toyota and General Motors had to help create a working environment that treated workers as long-term investments. For example, Toyota spent \$3 million dollars to send a contingent of seasoned workers from the former GM plant to premiere plants in Japan to learn the Lean Production System, which was a gesture whose sincerity did not go lost on the UAW local. Toyota gambled that G.M. Fremont's workers were not inherently poor employees but were in a bad situation and that the new system would successfully bring out the best in them.

NUMMI'S PRODUCTION SYSTEM: EXPLOITATIVE OR INNOVATIVE?

Paul Adler's 1993 work on NUMMI offers a detailed description of the plant and his observations during led him to coin the term "democratic Taylorism". He used the term to signify how the plant's work system amalgamated Tayloristic standardization with the skill bases and collaborative characteristics of craft-based production. NUMMI's work system, a direct derivative of Toyota's production techniques in Japan, differed from the way General Motors traditionally manufactured its autos in several ways. Although both methods share the principle elements of mass production, NUMMI's assembly line differed from G.M. Fremont's in several critical ways.

One key difference between General Motors' methods and Toyota's was that the latter used a pull-based production system, meaning operators upstream or early in assembly produced only as much as the following station withdrew. Pulling materials and vehicles through line contrasts with how the line was organized at G.M. Fremont where upstream stations "pushed" work down the line with little regard to whether or not the next station was ready to receive it. In other words, NUMMI's new assembly operation was a reactive system more sensitive to relations between workers up and down the production stream.

Though the distinction between "pull" and "push" production systems might appear minor in theory, but the difference in practice proved dramatic. Toyota's production methods required synchronicity among all workers at the plant, which was very different from production at G.M. Fremont where everyone worked at different paces. Moving materials through the line as they are needed used fewer materials and exposed production errors almost immediately. Mistakes or flawed parts at G.M. Fremont often were not caught until the entire vehicle was assembled that then required additional hours of re-work off the line. Errors were rarely significant enough to stop the line; production had to keep moving no matter the circumstances. G.M. Fremont's management had good reason to keep the line moving. For every minute the line was idle at G.M. Fremont, it cost the company roughly fifteen thousand

³⁷ Wilms, Welford. *Restoring Prosperity: How Workers and Managers are Forging a New Culture of Cooperation*. Random House, New York Times publishing, NY. 1996.

dollars.³⁸ Managers at G.M. Fremont framed all decisions on how to organize and execute production around the cardinal principle that the assembly line will keep moving under any circumstances.

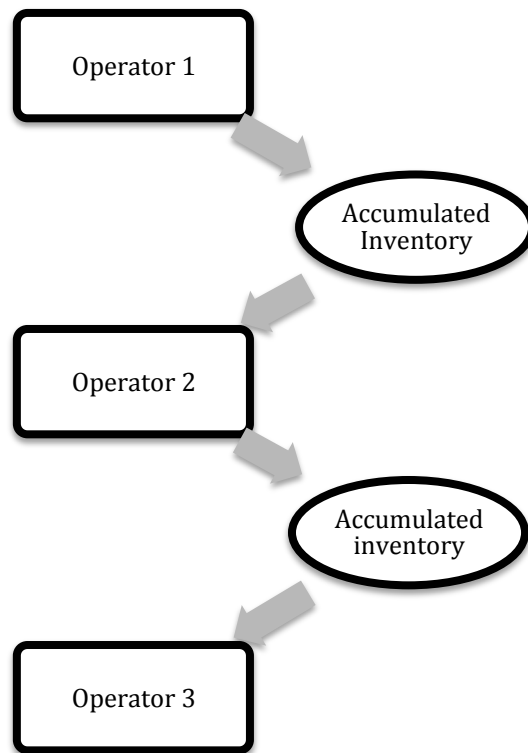


Figure 1: Push Production Illustration

As illustrated in Figure 1, the perennial dictum at G.M. Fremont to keep the line moving at all costs meant that operators shoved components and vehicles downstream to a queue of components amassed beside the line that operators drew from. Stockpiles of inventory smoothed out inconsistencies on the line, allowing line operators to work at varied speeds, but, keeping the line moving. Ironically, it was this omnipresent pressure to push materials through the plant that was actually adding to G.M.'s costs because flawed vehicles were re-directed at the end of the line to a re-work zone. Here, specialized maintenance staff, whom were often some of the most experienced workers in the plant, spent hours fixing all the errors not just on the finished vehicles but also the stacks of accumulated inventory throughout the plant that Toyota's workers fixed on the line.

³⁸ Episode 403: "NUMMI". Frank Langfitt. Producer Nancy Updike. [This American Life](#). National Public Radio, WEBZ, Chicago. Aired March 13, 2010.

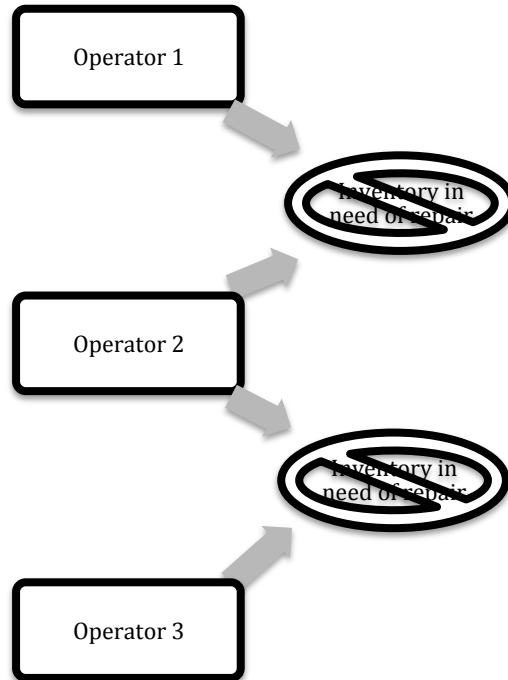


Figure 2 Push Production, Error Correction

Toyota re-imagined how the assembly line functioned at NUMMI by virtually eliminating standing inventories, manufacturing in smaller batches and implementing a pull-based assembly system. Although NUMMI shared much of the same equipment as G.M. Fremont, made it faster, easier and ultimately cheaper to repair production errors. It was standard practice in Toyota's Japanese facilities to borrow principles from batch manufacturing, gathering smaller amounts of materials on the line. Replenishing bunches of materials at the precise moment they're needed made it faster and less expensive to fix errors because there were not stockpiles of inventory that also needed repair or modification. Workers at NUMMI flagged errors as they occurred rather than waiting and overhauling vehicles at the very end. If a NUMMI worker was unable to perform a repair, every line worker had access to a number of different signals some of which summoned help from team members, team leaders or management and had access to one chord that even stopped the line. Detecting and fixing errors as they occur was a basic organizing principle at NUMMI. What had been tasked to experienced workers at G.M. Fremont was shared by all the workers at NUMMI.

Toyota built Error detection into NUMMI's line from how and when components moved through the factory to how workers communicated with one another in real time. Parker and Slaughter analogize pull production as a taught chain, where one broken link will be immediately evident whereas broken links are not clearly evident on a slack chain³⁹. Because production was pulled through the line, NUMMI operated only two hours of standing

³⁹ Parker, Mike & Jane Slaughter. "Unions and Management by Stress". In Editor: Babson, S. *Lean Work : empowerment and exploitation in the global auto industry*. Detroit, Wayne State 1995. Page 44

inventory (spare parts and components) as opposed to the roughly two days of idle inventory stacked near the line at G.M. Fremont, saving the company on the sunk costs of idle inventory and also without requiring a designated re-work area at the end of the line.

Stripping NUMMI's assembly line of spare parts and standing inventory also removed a key safety net for workers, meaning that if operators made a mistake there were not spare parts readily available for them to fall back on. This pressured line workers to be not just quick and consistent, but remarkably precise in their work. Switching to a pull-based assembly line was part of Toyota's broader diffusion of skill and discretion away from management and into the hands of its workers.

Managers at General Motors and Toyota had to amend workers' roles and responsibilities on the line because the system relied not on a cadre of specialized workers with narrowly defined jobs but on collaborative teams of workers who were well trained and rotated through multiple job tasks.⁴⁰ Implicit in Toyota's re-conceptualization is that management would not try to maintain tight control over how job design and work organization. Rather than dictating what workers will do, how they will do it and when, Toyota's production system is predicated to a greater degree on on-going consultation and cooperation between management and workers. Though it would be a mistake to characterize Toyota's NUMMI system as purely egalitarian, it was predicated on a broader base of joint-action.

Yet, the idea that former G.M. Fremont workers would simply cooperate and share insights with management could not be assumed. The union remained contrarian for a while but a year of unemployment dulled enough of the local union's militancy, that the leadership of Local 2244 listened to what Toyota and General Motors proposed. General Motors and Toyota inked a new collective bargaining agreement with the U.A.W., one that was unique to NUMMI that prohibited layoffs (employees could of course still be fired for cause) in order to garner the local's support. In exchange for that contractual guarantee, the new agreement replaced the old, rigid system of job classification and union seniority with a much simpler structure containing only a few broad job categories such as maintenance and assembly.

NUMMI's tailored collective bargaining agreement allowed Toyota to graft its practice of using work teams from its Japan-based plants to NUMMI's unionized workforce. The idea of work teams in advanced manufacturing is relatively straightforward: individual workers rotate through different jobs, shifting from one workstation on the line to another at regular intervals. Job rotation exposed workers at NUMMI to different aspects to production and rounded out their skills and capabilities. G.M.'s previous system of discrete job classifications appeared to have some advantages over NUMMI, drawing a classic reference from divided labor, the older system emphasized a workers depth of understanding on one specific task that's honed and gradually developed over a fairly extended period of time. A seasoned worker in G.M.'s older production system developed a focus that allowed workers to know when a machine was out of tolerance simply by the sound or feel of a machine's performance, and was able to fix it without stopping the line or interrupting production. NUMMI's production system on the other hand was quite demanding because it required that same depth and sophisticated understanding of four or five different production jobs. Job rotation and team-based problem solving were crucial components helping to broaden

⁴⁰ Adler, Paul. "Teams at NUMMI". Working paper for *Teamwork in the Automotive Industry*. Editors: Jean-Pierre Durand, Juan Jose Castillo and Paul Stewart. University of Southern California School of Business. December 1996.

workers' understanding of production and sharpening their expertise. Management at NUMMI pooled workers into several large groups, each of which was comprised of four distinct work teams containing between five and seven workers rotating through array of tasks. As a result, workers used training and job rotation to broaden their skills, making them more adept at identifying and fixing errors on the line.

Group and team leaders at NUMMI were central to production because they filled in for absent co-workers, assisted teammates with difficulties or complications on the line, trained new team members and acted as liaisons between members of their team and the larger plant-wide groups. Workers' experience and knowledge became important sources of innovation throughout the plant than under any previous General Motors regime. Greater professional discretion at NUMMI paired extensive training on and off the line, job rotation and a managerial guarantee against layoffs, giving workers appreciably more latitude and discretion to innovate. According to Paul Adler, NUMMI's work system exhibited the ideal balance between Tayloristic standardization and the latitude and quality of craft based production methods, it focused its worker's evolving base of skills and experience on continuously refinements of the production process. Adler, however, is quick to highlight that broadening workers' discretion to innovate on the job is successful at NUMMI because it was paired with intense standardization; in his words, "[standardization] reduced variability in task performance", improving quality, safety and the ability of workers to quickly adapt to changing circumstances.⁴¹

Adler does not shy away from the rather bold implications of his argument that NUMMI succeeded where other high performance auto plants in the United States did not primarily because of its collaborative, almost collegial work environment. He placed much of his emphasis on what he refers to as the plant's "learning bureaucracy" or the institutions committed to systematically improving workers skill and integrating their input into the decision-making fabric of the plant. On the line, teammates, not management, evaluated one another and offered corrective suggestions. At the level of the individual, workers had access to statistical profiles of their performance, known as statistical process control that noted pace, errors and other patterns. There were off line meetings with team leaders called quality control circles where they aired grievances and problem solved as a group. NUMMI also used an anonymous suggestion program and unlike other facilities with similar systems, NUMMI had a fairly high participation rate in these programs.

Adler and Wilms, two of NUMMI's early researchers see the plant's success as a watershed moment in American industrial relations: it was a unique approach to work organization that made NUMMI a model of transformative and globally competitive manufacturing. While it would be foolish to argue NUMMI was not efficient, other scholars have questioned Adler's and Wilms' accounts conclusions and how they interpret their evidence.

James Rinehart interpreted evidence from NUMMI quite differently than Adler, cross-examining his arguments along several axes: first, Rinehart argued that the cooperative work environment was not the product of "learning institutions", but rather is the result of a softened stance of the U.A.W. engendered by the two-year plant closure.⁴² Second, Rinehart

⁴¹ Adler, Paul S. "Time and Motion Regained". Harvard Business Review, January-February 1993. pp. 97-108. Page 103.

⁴² Rinehart, James. "The International Motor Vehicle Program's Lean Production Benchmark: A Critique". Monthly Review, January 1999. Page 24.

criticized previous studies of worker satisfaction at NUMMI, arguing they reflected less feelings of genuine satisfaction and fulfillment on the job than a measure of how fearful workers were of losing their jobs to plant re-location. Lastly and perhaps most important, Rinehart did not see any concrete, causal links between levels of cooperation and productivity, arguing the available evidence linking the two is at best correlative and at worst, circumstantial.

Rinehart's analysis is part of a larger turn in labor studies in the 1990s, of which NUMMI was a critical part, away from questions of whether or not domestic manufacturing firms could use high performance work organization to remain competitive to whether or not they are good for workers. It is on this question of worker satisfaction where the broader industrial literature is mixed. For James Womack and his co-authors, the efficiencies and proliferation of "lean production" systems highlights some of the social and economic inadequacies of Taylorist mass production, or the proposition that concentrating knowledge and expertise under the control of management is the most efficient way to organize production.⁴³ Womack's theories criticize the ideas of Frederick Winslow Taylor whose turn of the twentieth century scholarship proved highly influential with American academics.

In this model, management wrests control over the knowledge of production from workers, whom he saw as systematically "soldiering" or loafing on the job. Once freed from the slothful gripe of skilled workers, managers enhance their ability to innovate their products and production processes.⁴⁴ Taylor envisioned an economy where specialization and automation lower wages and production costs, broadening a product's given market and increasing consumption and employment. While Womack and his co-authors take issue with Taylor, discussions of Womack et al.'s argument turned not on the efficiencies of various high performance work systems as their technical superiority was already clear, but whether the physical welfare of those working on the line was being jeopardized.

Mike Parker and Jane Slaughter have taken issue with the claims of Adler and James Womack and his co-authors' M.I.T study that high performance work systems are good for both workers and employers. They argue instead that manufacturing processes devolve into systems that build up workers skills, but break down their bodies referring to these styles of production as "management by stress".⁴⁵ ⁴⁶ In a polemical and rather astute response to Adler and Womack *et al.*, they argue that "lean" production in practice assigns a greater volume and depth of responsibilities to individual workers, coercing faster, efficient performance from them by intensifying managerial pressure, while the company redistributes the risks and costs of inventory onto their supplier companies. Parker and Slaughter take issue with the concept of "multi-skilling", seeing it as a semantic recast of what is in practice saddling workers with

⁴³ Womack, James, Daniel Jones, Daniel Roos. *The Machine that Changed the World: The Story of Lean Production – Toyota's Secret Weapon in the Global Car Wars That is Now Revolutionizing World Industry*. Free Press. New York, New York. 1990.

⁴⁴ Taylor, Fredrick Winslow. *Principles of Scientific Management*. Dover Publications, 1998.

⁴⁵ Parker, Mike & Jane Slaughter. "Unions and Management by Stress". In Editor: Babson, S. (1995). *Lean Work : empowerment and exploitation in the global auto industry*. Detroit, Wayne State Page 44.

⁴⁶ Womack, James, Daniel Jones, Daniel Roos. *The Machine that Changed the World: The Story of Lean Production – Toyota's Secret Weapon in the Global Car Wars That is Now Revolutionizing World Industry*. Free Press. New York, New York. 1990.

extra work.⁴⁷ They also offer an insightful counter-argument to Adler and Womack's notions of so-called "bufferless" production that lean production runs with minimal spare parts or inventories. Rather they write, "The real buffer in 'bufferless' production is the workers, who are expected to put out extra effort over and above their normal job to maintain production *despite* [their emphasis] the unavoidable glitches", adding that terms similar to "creativity" and "responsibility" functionally amount to workers volunteering new and inventive ways to speed up their own work. They pose a simple but important rhetorical question: how much discretion and autonomy can a worker possibly have if they're physically active fifty-seven seconds out of every minute? Parker and Slaughter reach surprisingly optimistic conclusions about lean production, where they maintain the best way to prevent abuse under lean production is the same as it was under Fordism: independent labor unions.⁴⁸

Laurie Graham, an auto worker turned professor, weighed in on this debate and, unlike Parker and Slaughter, graciously credited Womack, Jones and Roos for accurately measuring the ways in which so-called "lean" manufacturing can be more efficient and productive than the prevailing methods of the time. As will be delineated in the following chapter, Graham's work is not just important in the broader debate over high performance work and its effects on workers, but the plant she studies parallels NUMMI as a Japanese joint venture using a high performance system with an American workforce coming online in the late 1980s. Despite clear connections between these two plants, Graham's conclusions are strikingly different than those of Womack and his coauthors. The techniques associated with Lean Production are more efficient and hold some promise for workers in terms of input, broader skills and higher wages if and only if the interests of workers and management can be "harmonized". But her study revealed, however, that Fordist notions of work intensification and a rigid work process often co-exist quite comfortably with the "Lean" principles of flexibility, cross-skilling and worker input.⁴⁹ Graham's talent for zeroing in on key issues is nowhere more apparent than when she eloquently argues that this debate turns primarily upon whether or not these work systems can realistically improve the lot of workers. While her argument is skeptical of that outcome Graham does not dismiss the possibility that lean production, can produce some positive change for workers and management. It is possible for the interests of these two parties to be aligned. It just did not happen during the course of her study.

NUMMI figures prominently in Ruth Milkman's 1997 *Farewell to the Factory: Auto Workers at the end of the 20th Century*, where she documents G.M.'s former plant in Linden New Jersey as they downsized its workforce and re-tooled its production lines for newer models. Milkman draws an explicit line of comparison between the New Jersey G.M. plant and NUMMI, noting that the latter's productivity, relatively high worker satisfaction and high levels of quality made it a "showcase" plant for G.M.⁵⁰ Milkman sees NUMMI as innovative and successful, but argues its quite exceptional in terms of the level of cooperation

⁴⁷ Parker, Mike & Jane Slaughter. "Unions and Management by Stress". In Editor: Babson, S. (1995). *Lean Work : empowerment and exploitation in the global auto industry*. Detroit, Wayne State Page page 43.

⁴⁸ Parker, Mike & Jane Slaughter. "Unions and Management by Stress". In Editor: Babson, S. (1995). *Lean Work : empowerment and exploitation in the global auto industry*. Detroit, Wayne State .Page 50.

⁴⁹ *Ibid.*, Page 142.

⁵⁰ Milkman, Ruth. *Farewell to the Factory: Auto Workers in the Late 20th Century*. University of California Press. California. 1997. Page 17.

characteristic of G.M.'s work systems used at that time. Although Milkman notes appreciable gains in productivity at her site in Camden, her research team did not see any changes in industrial relations between management or workers. In other words, her analysis notes how productivity and efficiency gains associated with HPWS are not necessarily connected to high levels of worker satisfaction or otherwise egalitarian relations as initially posited by Womack *et al.* and indirectly supported by Paul Adler and his work on NUMMI. Milkman agreed in principle with Graham in that high performance or "lean" production systems can be correlated with higher levels of worker skills and satisfaction but concluded that firms achieved remarkable performance with unsatisfied and non-integrated workforces.

Although they're critical of HPWS, Rinehart, Huxley and Robertson describe some of the ostensible goals of Lean Production as centering on "...job security, multi-skilling and challenging jobs, joint consultation and worker participation, and the reunification of mental and manual labor".⁵¹ Rinehart and his coauthors describe production at the CAMI plant as being a standardized work process stripped of buffers and inventories, making the process and its workforce more responsive to quality and the "...adjustment and rescheduling of human resources".^{52 53} Unlike Graham's more qualified critique of Lean Production, Rinehart et al argue rather unambiguously, "...it is the system of Lean Production itself that shapes management styles rather than the reverse".⁵⁴ In other words, they are turning Womack *et al.*'s argument on its head, that the time and cost pressures of the auto industry dictate how management shapes production and inner-plant relations rather than this allegedly new system where workers helped shape management's methods. In essence they are trying to foreclose on the possibility that Lean Production can transcend the limitations of Taylorist mass production arguing rather that workers are not more skilled, they just have more tasks to accomplish. For instance, their study documents that CAMI had several ways for workers to participate, including quality control circles, suggestion submissions and regular team meetings. Nonetheless, Rinehart and his coauthors noticed a sliding rate of participation in these programs as well as steadily declining levels of "commitment" to the plant. Never prone to understatement, Rinehart *et al.* note that low levels of commitment and participation escalated into a full-blown strike.

Berkeley labor economist Harley Shaiken has argued that although American high performance work systems are not synonymous with Japanese lean production, they do share key similarities. More important than the differences or similarities between these systems, according to Shaiken, is how these systems and policies are deployed on a plant-by-plant basis. In his analysis, differences between so-called high and low road versions of these systems do not hinge exclusively on the existence of team-based production, but rather the circumstances under which teams are used.⁵⁵ Shaiken's extensive case study of the Spring Hill Tennessee Saturn plant reminded readers that there is no way to make auto production "easy" in the strictest sense of the term; it is physically taxing work no matter how its

⁵¹ James Rinehart, Christopher Huxley & David Robertson. *Just Another Car Factory?: Lean Production and its Discontents*. ILRB Press, New York. 1997. Page 8.

⁵² CAMI was a manufacturing joint venture between General Motors and Suzuki in Ontario Canada that both companies created in 1986 and brought online in 1989.

⁵³ *Ibid.*, page 27.

⁵⁴ *Ibid.*, page 179.

⁵⁵ Shaiken, Harley. Steven Lopez. "Two Routes to Team Production: Saturn and Chrysler Compared". *Industrial Relations*, Volume 36, No. 1. January 1997. Page 19.

organized. Yet there are methods that increase worker input and satisfaction alongside rising productivity. Shaiken's study confirms Graham's and Parker and Slaughter's analysis on one crucial point: the presence of organized labor is perhaps the most important variable that determines how workers fare under various systems. The implication is that unions are critical in determining working conditions and levels of worker satisfaction and productivity.

There has been a marked change in how scholars and commentators frame the relationship between high performance production and workers in the 2000s. Scholars seemed to have shifted their attentions away from questions of whether or not these systems can reconcile workers' interests with management's demands because the broader context for auto work has changed. Between 1990 and 2000, the American economy experienced its longest period of sustained economic growth the resultant prosperity coddled American auto companies. After its near bankruptcy in 1991, General Motors padded its profits on the popularity of its trucks and Sport Utility Vehicles. Strong macroeconomic growth and solid sales of high margin vehicles meant that issues of contention between the U.A.W. and General Motors centered on the most equitable distribution of the profits and as detailed above, ways to lessen the intensity of working on the line. Nonetheless the macroeconomic context changed in dramatic and perhaps permanent ways as the near collapse of the global financial system in 2008 shifted the the political terrain on which these issues are debated. In other words, between a global recession, multi-billion dollar bailouts and greater international competition, circumstances since 2006 have forced scholars and major players in these debates to shelve concerns over working conditions on the line to focus on more fundamental risks facing the industry.

NUMMI, THE UAW AND CONTEMPORARY WORKING CONDITIONS

The broad technical dimensions of high performance work have not dramatically changed since the early 2000s, but the broader working conditions throughout the industry have worsened since 2007. I'm using the phrase "working conditions" means in the context and conditions of employment. The institutional elements such as unionization, higher compensation and job security that Graham, Babson and Rinehart argue counter-balance the physically demanding requirements of auto work have been weakened in discernable ways. Orchestrated by the Obama administration, General Motors' 2009 bankruptcy altered the 2007 U.A.W. collective bargaining agreement, forced union concessions on overtime wages, preserved a tiered wage structure, allowed greater use of temporary workers, discontinued the jobs bank and modified the Voluntary Employee Benefits Association health care trust.⁵⁶ Furthermore, the addendum eliminates cost of living adjustments to wages and retiree pensions, disallows workers from monetizing unused vacation time and applies overtime compensation while keeping compensation and pensions relatively in tact for more regular U.A.W. workers. While the 2009 addendum trims the margins for regular U.A.W. workers, the union made significant concessions on the wages and compensation for entry level and temporary workers⁵⁷. The modified agreement extends elements of the two-tiered wage system, a controversial part of the 2007 collective bargaining agreement, through the end of the next agreement in 2015. According to the original contract, new hires between 2007 and

⁵⁶ United Automobile, Aerospace and Agricultural Workers of America. "U.A.W. General Motors: Modifications to 2007 Agreement and Addendum to VEBA Agreement". May 2009.

⁵⁷ Ibid.

2011 would be considered “entry level” employees earning \$18 dollars an hour, 43% less than “regular” workers earning \$28 dollars an hour. Entry-level workers not only make less than other U.A.W. workers, but they’re offered limited health care coverage and no retirement benefits.⁵⁸ Although General Motors did not win major givebacks from its regular employees, the new agreement clearly extracts major concessions from entry level and temporary workers by freezing wages at \$16 dollars an hour and prohibiting entry level workers from becoming “regular” employees until the next collective bargaining agreement expires in 2015, in effect allowing Detroit automakers to hire as many new workers as they might need, pay them 43% less than other employees doing the same work, and not have to promote them for four years.

The modified contract grants automakers broader latitude regarding temporary workers, referred to as in the agreement as “flex employees” who can be hired on a part-time basis and fired as needed. While temporary employees are first in line to fill any vacant entry-level positions, that ability is moot because entry-level workers themselves are not going to be promoted. In effect, Detroit automakers have ensured that the generational low in autoworkers’ compensation will remain that way for at least four more years, and as the economy continues to recover, entry level and temporary employees will be doing the same work as their more senior counterparts without retirement benefits and at 60% of their wages without the possibility of promotion.

The May 2009 addendum altered both the quantity and character of General Motors’ contributions to the U.A.W. health care trust. The 2007 collective bargaining agreement established a financial trust, funded by automakers and managed by the U.A.W. to finance the long-term health care expenditures for retirees, which removes the obligations from the automaker’s balance sheets. The 2007 health care trust, in its original form, was a policy compromise between the Detroit automakers and the U.A.W. designed to remove the costs of providing health care from automakers’ balance sheets by placing billions of dollars into a long-term trust that over time would pay the health care costs of current and retired employees. Of course, in return for removing over a hundred billion dollars in unfunded health care liabilities from their balance sheets, automakers were required to make regular payments into fund that, which with time and proper investment management was supposed to grow \$70 billion dollars. According to the 2009 addendum, however, G.M. can substitute a good portion of its cash obligations with a combination of preferred and common stock, providing the U.A.W. with non-voting preferred stock with an 9% annual dividend of \$585 million dollars, as well as 17.5% of common, non-voting stock in the new company.

The danger of accepting stock in lieu of cash is that it inextricably tethers the workers’ ability to pay for health care to the performance of one specific company. The U.A.W.’s preferred stock would have relatively high priority to the liquidated company’s assets, though preferred stock still remains subordinate to company bondholders whom have first claim. Non-voting common stock, on the other hand, carries a claim to the company junior to those holding bonds and preferred stock. Therein lies the subtext to this negotiation. It is hard to imagine that General Motors did not understand that given the risks the U.A.W. was being asked to shoulder and on the other side, it is seems improbable that any organization would bet their members’ health care for the next thirty years on a single company that’s just emerging from bankruptcy. Hence, the only reasonable and realistic course of action for the U.A.W was to sell their stock shares immediately, absorbing a considerable loss in the process. Bankrupt or not, this allowed G.M. to preserve cash and forced the U.A.W. to take a

⁵⁸ Ibid., page 2.

severe financial loss while freezing promotions and wages for all its workers over the next four years. This remains part of the broader, deteriorating milieu of automotive employment.

CHAPTER TWO

ORGANIZED LABOR AND THE SECURING OF AMERICAN COMPETITIVENESS

Most studies of NUMMI maintain that the plant's success turned on its unique work system, cooperative industrial relations and use of a highly trained workforce. These studies have made critical contributions but overlook the important role that organized labor played in NUMMI's development and success. My own point is that NUMMI's strengths developed partly out of technological change, macroeconomic necessity and mutual self-interest, but it was organized labor and a collective bargaining agreement that bound these factors together and ensured their long-term synergy. I use efficiency wage theory to argue that contractual guarantees protected workers, elicited and secured their maximum effort on the job. I contrast my point with a case study of a Subaru-Isuzu joint venture that opened at approximately the same time as NUMMI used a non-union workforce whose development proved more problematic than NUMMI's. Lastly, I cite a case study from General Motors' joint venture in Canada (CAMI) to support my point that the presence of organized labor alone is not sufficient to ensure competitiveness; successful high skill manufacturing also depends on the viability of the broader business ecology in which it operates.

G.M.'s bankruptcy and subsequent withdrawal from NUMMI sparked Toyota's announced that it too was considering leaving the Fremont plant and touched off a blitz of 24-hour media coverage, interviews and rallies that placed the plant atop California's headlines. It was not uncommon to hear reporters referring to NUMMI as Toyota's only unionized workforce and the company's highest cost plant in the United States and that NUMMI's workers made more than Toyota's non-union employees. Such claims are misleading while NUMMI's wages were higher than others, the total compensation for NUMMI employees was actually less than Toyota's plants in the Midwest and south.⁵⁹ Simultaneously, NUMMI was consistently rated among the most efficient plants in the country.

Industry analysts use "workers per vehicle" (WPV) as a measurement of manufacturing efficiency to compare plants side-by-side. The statistics takes a plant's total daily production and divides the number by a plant's total employment. Using this metric, NUMMI's efficiency was measured in 1996 and had an average of 2.62 WPV while the rest of G.M.'s plants that year averaged 3.62 WPV, indicating that NUMMI was more efficient than the majority of G.M.'s other operations.⁶⁰ Nonetheless, producing more cars with fewer workers than other G.M. plants or even reducing the number of hours required producing autos at NUMMI are not meaningful measurements if the quality of the product does not measure up.

Bill Lockyer, California's Treasurer, commissioned a study that investigated many of the claims Toyota made and to gauge the impact of the plant's closure on California's economy. The commission debunked Toyota's assertion that the cost of operating NUMMI was exceptionally high, noting that NUMMI's performance mirrored that of the most efficient plants operating in the United States between 2003 and 2007. Using "hours per vehicle", a standard industry measurement of efficiency, NUMMI consistently decreased the number of hours it took to produce vehicles. NUMMI was 18% more efficient in 2007 than it was in

⁵⁹ Ibid.

⁶⁰ Stanford Graduate School of Business. "New United Motor Manufacturing, Inc. (NUMMI)". Case Study HR-11. December 2, 1998. Page 6.

2003, and at nineteen hours per vehicle, the plant was only slightly behind America's most efficient plant that clocked eighteen hours.⁶¹

Vehicles that rolled off the line at NUMMI won a number of awards for quality. For instance, J.D. Power and Associates rated the Toyota 4X4 best pickup in 1992 and the Toyota Tacoma best pickup in initial quality in 1995, 1996 and 1997 and "Pickup of the Year" a second time in 2002. NUMMI earned J.D. Power's Silver and Bronze awards for manufacturing plants in 1994 and 1995 for the Toyota Tacoma. NUMMI won the Silver Plant award in 1999 and 2000 for producing the Corolla. The car itself was named best compact car by J.D. Power in 2002 and 2004. Finally, NUMMI was awarded the J.D. Power Chairman's Award for quality initiatives in the year 2000. Lingering questions as to NUMMI's performance or costs should have been put to rest, as NUMMI consistently was recognized for its performance on a regular basis.

G.M. and Toyota both considered NUMMI viable enough to expand production and this pattern of augmenting production continued for several years.⁶² For instance, NUMMI's total production volume in the fourth quarter of 2004 was 3.4% higher than the same period in 2003. NUMMI's volume was 7.5% higher in the fourth quarter of 2005 over that of 2004 and a 2.5% in the fourth quarter of 2006 over 2005.⁶³ Overall production declined by several percentage points in 2007 and by 12.5% in 2008, but those numbers are due to the economic downturn in 2007 and 2008 and not NUMMI's operations.⁶⁴

National Public Radio's *This American Life* aired a thoughtful and well-executed report on NUMMI in 2010 that investigated reasons for the plant's closure and what its broader significance was to General Motors. The report, narrated by NPR's automotive correspondent Frank Langfitt, suggests that beyond the technical dimensions of Lean Production, NUMMI's early success among its peers is due less to its technological layout than the active collaboration between management and the plant's workers.⁶⁵ Though their report on NUMMI was thorough, *This American Life* tracked the line Paul Adler established many years ago; that NUMMI's success is derivative of its highly organized system of learning, skill development, integration of workers into decision-making, and finally, cooperation and trust between management and workers. Adler does not go quite so far as to argue that cooperation is requisite of efficiency but the tenor of his arguments is that over time it is in the best interests of both management and workers to cooperate. Adler mentions almost in passing that NUMMI was a unionized plant but that fact never occupies a place of any prominence in his analysis. First, the automotive case literature does not support the proposition that cooperative worker/management relations are absolutely necessary for lean/high performance systems to operate; NUMMI suggests that cooperation can be a powerful influence on productivity. Second, the presence of organized labor at NUMMI and a binding collective bargaining agreement solidified the cooperative relationship between management and workers and made it stronger.

⁶¹ Shaiken, Harley. "Commitment is a Two-Way Street: Toyota, California and NUMMI". Working Paper Series, Institute for Research on Labor and Employment. UC Berkeley. March 3rd, 2010. Page 18

⁶² Ward's North American Production Schedule 2004.

⁶³ Ward's North American Production Schedule 2005.

⁶⁴ Ward's North American Production Schedule 2007, 2008.

⁶⁵ "Episode 403: NUMMI". Frank Langfitt. Producer Nancy Updike. *This American Life*. National Public Radio, WEBZ, Chicago. Aired March 13, 2010.

COOPERATION AND TRUST AT NUMMI

Adler broke down the particularities of NUMMI's work system into three broad categories: technological and workforce requirements and supporting managerial policies.⁶⁶ Toyota did not want a completely new way of organizing manufacturing; instead the principles of lean production retain the need for standardization, discrete divisions of labor and line-based production designed to maximize volume. That is not to say that Toyota was not proposing some truly profound changes to G.M.'s production system. Central to these changes was the use of teams of multi-skilled workers that rotated jobs and tasks both on and off the line. The idea of relying on seemingly roving "teams" of workers was antithetical to the practices of the U.A.W. and G.M. up to this point. Rigid job classifications maintained a level of comfort for both the company and the union, as they protected workers' job security and ensured regular promotions while management retained tight control over the broader process.⁶⁷ Adler's analysis focuses on the benefits of job rotation, where rotating through different tasks helps workers acquire a broader, more holistic sense of the overall process. Virtually no one disagrees that team-based production in high tech manufacturing is more efficient and tends to increase overall rates of quality.

Nevertheless, James Rinehart has raised some important concerns about Adler's studies. Rinehart referred to Paul Adler as an "enthusiastic source" of data on NUMMI and implied his studies lacked critical perspective on the less than ideal aspects of production there. Rinehart thinks that NUMMI's productivity had more to do with modular production than HPWS. He argued that NUMMI's measured efficiencies were artificially inflated because NUMMI manufactured modular vehicles that shared a number of their components with other vehicles, which made it easier and faster to assemble them. But Rinehart overlooked the fact that while it is true that the Corolla and the Pontiac Vibe share a frame and drivetrain, NUMMI also made the Toyota Tacoma, which of course shares no parts or components with the Vibe or Corolla. Furthermore, NUMMI was not the only plant in the United States that produced two vehicles that shared platforms, and all three of NUMMI's vehicles consistently ranked in the top of their respective classes for quality. Finally, Rinehart argues that surveys measuring worker satisfaction at NUMMI do not adequately reflect the fear workers feel about losing their jobs needs to be qualified. One cannot dismiss previous findings without actually going into the structure of the surveys themselves.

One of the defining cleavages in the case literature between high performance work systems and regular mass production is that high performance systems, such as Toyota's, are designed to adapt to problems on the line or changes to the production process as they occur, with the expressed purpose of minimizing downtime and cost. While very few people close to these issues would disagree that it is important for all elements of a high performance operation to have confidence in each other's work, again, there are two questions that remain unanswered: one, how do we objectively measure "trust" and how much "trust" is necessary to achieve higher levels of efficiency? Second, Adler's explications of trust are dependent on

⁶⁶ Adler, P. S. B. G. a. D. L. (1997). "Ergonomics, Employee Involvement and the Toyota Production System: Case Study of NUMMI's 1993 Model Introduction." *Industrial & Labor Relations Review* Vol. 50. Number 3. Pages 416-437. Page 419.

⁶⁷ Adler, Paul. "Teams at NUMMI". Working paper for *Teamwork in the Automotive Industry*. Editors: Jean-Pierre Durand, Juan Jose Castillo and Paul Stewart. University of Southern California School of Business. December 1996

the structure of lean production, that the small margins for error ensure, by necessity that everyone perform their job correctly. Adler does not mention that intra-firm trust exists on a wide spectrum in the automotive case literature, but also that what may be interpreted as “trust” at NUMMI is seen as coercive at other plants and beyond purely subjective interpretations. The details do give us a better sense of the distinctions between NUMMI and other plants, but of course questions still remain.

For our understanding a crucial point of difference between NUMMI and other high performance factories is the three forms of trust that Adler outlined: consistency, congruence and competence. Looking first at consistency, Adler and his co-authors maintain that NUMMI’s flexibility and response times hinge on workers and management having confidence in each other to consistently follow through on promises, or as Adler terms it, “consistency trust”.⁶⁸ According to this particular line of thought, altering NUMMI’s work system depended on the mutually held assurances that workers and managers will approach changes transparently and will execute them with a high level of consistency. For such an important point, Adler is remarkably scant on examples, but the principles and components seem clear. Consistency laid the foundation for the other forms of trust Adler sees as having driven NUMMI, the second of which is confidence that each party has the skills or the competence to complete their assigned tasks. “Competence” trust is a rather technical way of saying that management invested in the skills of its workers because not doing so would have made it harder to implement changes, which is a dynamic NUMMI was known for. It is not certain after reading it that these factors are unique to NUMMI.⁶⁹ Lastly, Adler saw NUMMI’s “meta-processes”, which is a term for changing other standard procedures as most efficient when managers and workers worked towards the same goal. What Adler refers to, as “congruent” trust at NUMMI may have been unique in the sense that NUMMI combined all forms of trust and made workers and managers feel as if they’re more or less moving towards the same goal. Yet, the question of what effect these had on the plant’s performance remains unanswered.

THE ORIGINS OF COOPERATION

Assuming Adler is correct when he argues that “intra-firm” trust was critical to NUMMI’s success, the question of when and how this trust was established and how it was maintained over such a lengthy period remains underdeveloped. Adler does present three explanations for how “trust” was developed throughout the plant as well as how it was sustained, but he’s cagey about putting emphasis on any particular factor and some of his evidence is either a slight overstatement or otherwise contradictory to emerging studies at the time. Adler seems to think there are two primary reasons why “trust” developed at NUMMI: the fragile structure of lean systems and the very realistic understanding that Fremont, California, is not the only place in the world where high quality cars can be produced. In

⁶⁸ Adler, P. S. B. G. a. D. L. (1997). "Ergonomics, Employee Involvement and the Toyota Production System: Case Study of NUMMI's 1993 Model Introduction." *Industrial & Labor Relations Review* 50(3): 416-437. Page 51.

⁶⁹ Pausing here for a moment, it is not altogether clear that skill development is unique to NUMMI; while that was clearly novel when first penned, skill development is now widely considered standard practice in most automotive facilities, though admittedly Adler’s point is not just if workers acquire new skills, it is how they use them.

other words, the nature of the production system itself and intense global competition keeps everyone in line cooperative and productive and forces them to cooperate and be productive. Both of these depend on a third axiom: the people associated with NUMMI have a realistic understanding that there are costs to long-term uncooperative relations between workers and management. Adler *et al.* write “Game theory and common sense suggest that there are long-term costs to short term opportunism, because over time both parties find it valuable to maintain a reputation for fair dealing”.⁷⁰

I do not entirely disagree that both parties understand the tight coordination their system requires, it should be noted that this line of reasoning is dangerously close to the arguments of Womack *et al.*, that lean production’s lack of buffers, tight lead times and incessant competitive demands for quality demands that management and workers cooperate to quickly solve problems and implement changes. There really is no choice. Cooperation is not an independent variable in the equation. This would seem technologically determinate and leaves no space for labor relations and their variability. In fact, evidence from NUMMI highlights that when present, cooperative industrial relations, secured by organized labor place a plant in the best possible circumstances to succeed. Recasting the relationship between cooperation and productivity as complimentary as opposed to compulsory allows us that even though manufacturing can operate quite effectively without harmonious industrial relations, when present cooperation can augment a plant’s performance.

Recent work on NUMMI repeats Adler’s mistake. A study out of the Rochester Institute of Technology by Sandra Rothenberg, attempted to quantify the exact manifestation of cooperation at NUMMI. Her study focused on the plant’s environmental policies but like Adler’s analysis, misinterpreted “cooperation” at NUMMI. She argued that changes to NUMMI’s environmental management policies were proposed and executed by non-managerial staff, which aligns very with Adler and others’ depictions of NUMMI. Rothenberg repeats that NUMMI coherently organized employee participation programs, such as suggestion boxes and quality control circles and had a system that disseminated production data throughout the plant. She argues that NUMMI is unique in the way it solicits and harvests what she terms workers’ “contextual” knowledge, or understandings of the actual processes in action and combines it with participation in a meaningful way.

But her statistical notations tell a different story, namely that not everyone participates equally in the process, with “specialized workers”, actually initiating the vast majority of procedural changes. Her study distinguishes between workers who “initiate” project changes and workers who “implement” or actually execute these projects. It is clear that although line workers are involved in implementing new projects or processes, their role in actually initiating or proposing such changes is very small relative to that of specialized workers, or those with specific expertise in a particular area and who do not ordinarily spend extended periods on the line.⁷¹ Rothenberg’s data reveals a top-down, or laddered trend in who’s initiating changes relative to who’s actually carrying the changes out. Rothenberg’s findings are dissonant with Adler’s refrain that changes at NUMMI are driven largely by those closest to the production process. Now it is not clear why line workers in this particular area of the

⁷⁰ Adler, P. S. B. G. a. D. L. (1997). "Ergonomics, Employee Involvement and the Toyota Production System: Case Study of NUMMI's 1993 Model Introduction." *Industrial & Labor Relations Review* 50(3): 416-437. Page 63

⁷¹ Rothenberg, Sandra. “Knowledge Content and Worker Participation in Environmental Management at NUMMI”. *Journal of Management Studies*, Vol. 40, No. 7. November, 2003.

plant did not contribute. Perhaps they had the opportunity to contribute, but they choose not to. She cites one example of “collaboration” when a project engineer asked someone on the line where the best light angle was as they were changing the bulb. This is a relatively trite example of worker incorporation, however, and detracts from the overall gravity of her argument.

The problem is that Adler and Rothenberg interpret “cooperation” at NUMMI in a very narrow sense. Cooperation is not just coordination and teamwork but it is also an exchange of exceptional effort for exceptional pay between workers and management. George Akerlof wrote about this in 1982 when he reframed the labor market relationship between high wages and high productivity as reciprocal, dynamic and not bound by supply and demand. He described this relationship in the following way:

As a consequence of sentiment for the firm, the workers acquire utility for an exchange of “gifts” with the firm – the amount of utility depending on upon the so-called “norms” of gift exchange. On the workers’ side, the “gift” given is in excess of the minimum work standard; and on the firm’s side the “gift” given is wages in excess of what these [workers] could receive if they left their current jobs.⁷²

Akerlof’s argument that wages and productivity, at the microeconomic level, are dynamic factors that are often linked by explicit or quid pro quo agreements shades my interpretation of success at NUMMI. Workers at NUMMI exchanged or “gifted” NUMMI’s management with prodigious effort and management gifted workers decent compensation and job security. The result of this agreement expressed on the shop floor as cooperation. Unlike Akerlof’s example, this gift-exchange relationship at NUMMI was contractually guaranteed.

THE ROOTS OF COOPERATION: THEORIES OF EFFICIENCY WAGES

What Adler described, as “cooperation” at NUMMI should not be reduced to teamwork or a simple partnership. Rather, using Stiglitz, Shapiro and Akerlof’s work, there is a way to interpret cooperation at NUMMI’s labor contract as the visible expression of NUMMI’s contract that bound exceptional performance to exceptional guarantees. Joseph Stiglitz and Carl Shapiro expanded Akerlof’s 1982 work and constructed a theoretical model of how productivity and wages interact in labor markets, one that sheds some light on what might have been occurring at NUMMI. Stiglitz and Shapiro present a model that shows how, subject to certain conditions, above market-clearing wages increase productivity and lower costs. Stiglitz and Shapiro’s theoretical insights bring several other possible explanations for NUMMI’s high performance forward, including the plant’s wages/compensation structure and job security.

Though their article is somewhat dated it remains pertinent to this discussion. Shapiro and Stiglitz present a series of equations expressing various relationships between wages, involuntary unemployment and productivity arguing that paying above market wages can be more cost effective and efficient for a firm because it reduces turnover costs, reduces the costs of monitoring workers and increases the individual and collective effort workers exert on the

⁷² Akerlof, George A. “Labor Contracts as Partial Gift Exchange”. *The Quarterly Journal of Economics*. Vol. 97, No. 4. November, 1982. Page 544

job.⁷³ Now, there's a certain eloquence to Stiglitz and Shapiro's argument that's difficult to replicate, so to paraphrase them, workers exert more effort on the job when they "value their jobs", enhancing individual and group output/productivity. At first glance, this might seem obvious, but as they point out, high wages play a pivotal, actuating role in this model in two ways: first, workers earning above market wages maximize workers' "utility", which is a term economists use to signify current as well as expected future levels of income and opportunities, in effect encouraging workers to stay on the job. Second, premium compensation maximizes the penalties on workers for quitting and poor performance, as workers are coerced into better performance by understanding the income and opportunities they stand to lose.

According to their model if someone is making a premium wage and unemployment rates are relatively high, with low levels of benefits, several things happen: First, the expected utility of an unemployed person is low given the weak demand for labor and bad unemployment benefits that have a downward drag on the what they refer to the Non-Shirking Condition (NSC), or the wage that maximizes someone's effort on the job. Second, the wage to satisfy the NSC condition must be high enough so that workers stand to lose a considerable amount if they're fired, compelling more on the job effort. In their analysis, workers' sustained effort and productivity can be the result of discipline imposed by high wages and job security – that is conditions relative of course to prevailing in the labor market rather than the purely technical/workforce requirements of manufacturing.

Stiglitz and Shapiro were expanding on a 1979 paper Steven Salop, who argued that because of imperfect information and related wage rigidities, product and labor markets do not expand and contract in unison, creating "frictional unemployment" between employment sectors that is causally unrelated to shifts in aggregate demand. One piece of his argument is that there is a proportional relationship between labor market conditions or "tightness", turnover and wages. Salop points out that there are sound reasons supporting the claim that relatively high wages in capital and skill intensive industries can prove cost effective. Of course, if unemployment increases, wages fall and turnover costs decline, all things equal. He sees turnover as imposing both "direct" and "indirect" costs on firms.

Hiring new employees involves investing in employee screening as well as paid training periods. Furthermore, new employees can be quite costly because less experienced workers reduce productivity. For Salop turnover costs are not one-time expenses. He argues that indirect productivity costs should be calculated by amortizing the increased marginal costs (due to lower productivity) of new workers over a year and adding it to the wages that they earn, giving us a more accurate read on the costs of turnover.⁷⁴ The point here is that rather than dragging on an auto manufacturer's bottom line, above market wages can increase worker effort and productivity while minimizing the direct and indirect (marginal) costs of employee turnover. Stiglitz, Shapiro and Salop provide a solid theoretical base for the argument that high wages play a critical role in NUMMI success.

Turnover was not a significant issue at NUMMI, as its annual rate typically hovered around 3%. This was due both high levels of worker satisfaction and fair compensation. Additionally, the team and job rotation aspect of NUMMI's work organization mitigated

⁷³ Stiglitz, J. E. a. C. S. "Equilibrium Unemployment as a Worker Discipline Device." *American Economic Review* 1984 volume 74(3): 433-444.

⁷⁴ Salop, Steven. "A Model of the Natural Rate of Unemployment". *The American Economic Review*. Volume 69, No.1. March, 1979. Page 117

some of the costs of turnover, as workers were capable of compensating for the lower productivity of new workers.⁷⁵ Low turnover had additional benefits: workers felt free to propose production changes not because they trusted management but because Toyota and G.M. were contractually prohibited from laying them off. Fewer layoffs also mitigated the need for discrete job classifications at NUMMI, which traditionally allowed workers to develop deep knowledge of one specific job, ensuring their continued employment. NUMMI's relatively flat job classification system required workers to learn multiple areas of specialization, and in effect, transform line workers into skilled tradespersons. This ensured that quality was maintained at every station.

THE ROOTS OF COOPERATION: THE UNION CONTRACT

Theories of efficiency wages help explain NUMMI's productivity but miss how organized labor at NUMMI acted as a social and political adhesive that bound compensation, trust, skill and low turnover with productivity. Proving this is difficult in part because it is no longer possible to observe this synergy at NUMMI. I can, however, counter-pose the NUMMI case where a union was present to Laurie Graham's research at the Ohio based Subaru/Isuzu plant. SIA, as the facility was known, was a joint venture between Subaru and Isuzu that bore more than a passing resemblance to NUMMI in how it organized its work, but the contrast to NUMMI is that SIA was a non-union plant. The SIA plant came on line three years after NUMMI in 1989 and used a Japanese version of Lean Production with an experienced American workforce. SIA used a pull-based assembly system with minimal inventories and multi-skilled work teams, achieved high levels of quality and productivity, but in contrast to NUMMI, the Subaru-Isuzu plant maintained this performance with a disgruntled workforce that was not integrated into the plant's decision-making process.⁷⁶

SIA fell apart because rising employee workloads were not matched with meaningful job security, individual or team discretion, advancement opportunities or even adequate channels for complaints. In contrast, NUMMI's collective bargaining agreement contractually guaranteed all of these factors and more, allowing them to work in synergy throughout the plant. For example, the slogan of "continuous improvement" was an organizing principle at both NUMMI and SIA but, according to Graham, improvements at SIA were applied mostly to the physical arrangement of workstations and sometimes to more comfortable ergonomics. But when it came to addressing the production process itself, management at SIA relied exclusively on Taylorist "time/motion" studies, where a manager or another team-member clocked another's tasks and looked for spare seconds (literally, seconds) where the worker's time would be put to more productive use. If someone finished their tasks early, they were assigned more work. Managers at SIA were exceedingly efficient at keeping their workers moving were indifferent to the welfare or input of its line workers.⁷⁷

The reality of "collaboration" at SIA is rather sobering in comparison to NUMMI. Graham notes how management at SIA was responsive to some changes to production but maintains that few of these changes originated from workers. Moreover, few worker

⁷⁵ Hummels, Harry & Leede, Jan de. "Teamwork and Morality: Comparing Lean Production and Sociotechnology". *Journal of Business Ethics*. No. 26. 2000. Page 76

⁷⁶ Graham, L. (1995). *On the Line at Subaru-Isuzu: The Japanese Model and the American Worker*. Ithaca, New York. ILR/ Cornell University Press.

⁷⁷ *Ibid.*, Page 105.

suggestions on regarding their physical health were ever implemented. In addition SIA, like NUMMI, used quality control circles, which were team meetings between elected team representatives and managers where workers made suggestions and offered their input - policies already standard across the industry at that time. Yet, there was not an administrative link to the broader processes of decision-making in the rest of the plant⁷⁸. Teams met briefly before the start of each shift, but these meetings were typically reviews of productivity statistics from the previous shift, showing with incredible precision where individual worker's performance dropped off. At NUMMI, evaluations were supposed only part of the meetings, the other component was supposed to be team "kaizen" making collaborative suggestions to improve the production system and working conditions. A simple performance review is not exactly what workers at SIA were promised and, over a matter of months, according to Graham, a palpable cynicism developed on the shop floor, as one by one, workers stopped participating in the meetings.

SIA's productivity was the result of old-fashioned methods of faster line speeds, shrinking cycle times and more physical exertion. Graham notes how people were pushed to their physical limits as repetitive stress injuries, sprains and a host of other documented injuries rapidly increased as the new plant came online.⁷⁹ Reasonable controls over the pace of work, decent pay and workplace injuries (particularly for women) are demands as old as industrial manufacturing itself. Graham concludes, "With a union particularly sensitive to gender-related issues, workers have a chance of pushing the Japanese model beyond its present limitations and shaping it into something that more effectively reflects family/worker interests".⁸⁰ Graham's point aligns with mine in that the presence of a binding collective bargaining agreement is the crucial difference in long-term success between these two plants.

Graham's argument about SIA can be complimented by historical work on CAMI, a joint venture between General Motors and Suzuki that was based in Canada. General Motors' Canadian joint venture with Suzuki used a lean production system that mirrored many aspects of NUMMI and SIA because it used a team-based system of rotation and cross-skilling, low inventories and pull-based assembly lines. CAMI adds a critical dimension to my argument because it demonstrates that the presence of organized labor is a critical but insufficient condition on its own for sustainable success. CAMI, unlike SIA, was a unionized facility that was represented by the Canadian Auto Workers.

This Canadian plant appeared to have the all the ingredients necessary for success in a unionized and experienced workforce, a willing partner in G.M. and Suzuki and a lean production system. The plant came online in 1989 and contrary to what happened at NUMMI, industrial relations took a nosedive almost immediately. G.M. and Suzuki promised the union and its workers substantive input on the production floor and overall management of the plant and in a manner similar to NUMMI and SIA. CAMI used quality control circles, a suggestion program and regular team meetings to integrate workers. Industrial relations at CAMI devolved into a strike three years after opening because management did not follow through on its promises. Workloads throughout the plant kept increasing, work teams had no discretion despite initially high levels of worker participation, and the union claimed CAMI's

⁷⁸ Ibid., Page 82.

⁷⁹ Ibid., page 91.

⁸⁰ Graham, L. (1995). *On the Line at Subaru-Isuzu: The Japanese Model and the American Worker*. Ithaca, New York. , ILR/ Cornell University Press. page 154.

management systematically ignored workers' suggestions and grievances.⁸¹ Worker participation in these programs and overall satisfaction plummeted and made a confrontation with management inevitable.

A key difference between CAMI and SIA, however, is that the Canadian Auto Workers initiated a five-day strike and won significant concessions on worker discretion and union input over production standards and work methods⁸². Workers at CAMI, unlike those at SIA, had several avenues to redress what they felt were unfair labor practices. CAMI in its original design certainly had all the ingredients necessary for successful high skill manufacturing. Nonetheless, its acrimonious start reinforces lessons from NUMMI and SIA that all parties (in this case, G.M., Suzuki and the CAW) need to uphold their contractual obligations on work organization and compensation for these plants to work at peak efficiency. Top management at General Motor and Suzuki worked with the Canadian Auto Workers but local CAMI managers failed to perform their contractual duties, which in turn alienated workers and damaged the plant's performance. The presence of organized labor in this case study gave workers avenues of recourse and redress that were simply not available to workers at SIA and was why CAMI ultimately succeeded.

⁸¹ Kumar, Pradeep and John Holmes. "Canada: Continuity and Change". In *After Lean Production: Evolving Employment Practices in the World Auto Industry*. Ed. Thomas Kochan, Russel D. Lansbury, John Paul MacDuffie. ILR Press, Cornell University. Ithaca, London 1997. Page 101.

⁸² High, Steven. *Industrial Sunset: The Making of North America's Rust Belt, 1969-1984*. University of Toronto Press Scholarly Publishing Division. May, 2003.

CHAPTER III: ALLIANCES AND LEARNING DISABILITIES: NUMMI AND THE MIS-EDUCATION OF GENERAL MOTORS

NUMMI, in conversation with CAMI and SIA, highlights the importance of high wages, job security, collective bargaining agreements, dynamic forms of work organization and worker involvement policies to globally competitive manufacturing. Yet as CAMI's example demonstrated, this is not a recipe for automatic success. Historical evidence from General Motors' facilities in Linden, New Jersey, Van Nuys, California and the Saturn plant in Spring Hill, Tennessee shows that efficient work organization and organized labor are not sufficient to keep these plants open. The most successful manufacturing plants had skilled workforces and union-backed collective bargaining agreements, but, as these examples highlight, these plants also need continued support from their parent companies, both politically and logistically, to operate efficiently.

This chapter examines two important questions: first, what other factors are at play in successful high performance manufacturing? Second, to what extent did General Motors recognize the importance of NUMMI and diffuse its knowledge to other plants? The additional case studies place NUMMI in a broader context as one part of G.M.'s efforts to revamp its operations and restore the company's competitiveness. General Motors' experimentations demonstrate the inadequacy of their approach to reform, as it failed to apply the insights from NUMMI elsewhere in a timely manner. The company's failed projects during the 1980s and 1990s nonetheless highlight three additional factors that help determine successful manufacturing: the logistical support of supplier companies, consistent leadership and political support from the parent company and the active support of local actors in the union and management.

GENERAL MOTORS AND THE LESSONS OF NUMMI

Mike Bennett, a former U.A.W. official and worker at General Motors' Saturn plant in Spring Hill Tennessee, responded to pointed questions of why G.M. did not apply techniques and lessons from Saturn to the rest of the company, arguing that General Motors' top management suffer from "...learning disabilities".⁸³ In this crisp and surprisingly candid interview, Bennett encapsulates a growing subset of explanations for why General Motors failed to bring the manufacturing techniques, managerial practices and broader industrial know-how learned at Saturn and NUMMI to bear on its wider operations. While it is tempting to agree with Bennett's characterization of G.M., it is a view that obscures what is in reality a very complicated set of circumstances. Paul Ingrassia, a Pulitzer Prize winning journalist, agreed with Bennett as he criticized G.M.'s bloated corporate culture along with a stubborn union that together scuttled all attempts to reform production through the 1990s.

Both arguments have merit, but suggestions that G.M. was incompetent are off the mark because they successfully implemented high performance systems in plants located in Mexico, Argentina and Brazil, in addition to their Saturn plant in Tennessee and, of course, NUMMI. Yet, General Motors offered inconsistent support to its various projects, encountered resistance from the U.A.W. international and pockets of resistance and acrimony

⁸³ Thompson, Chrissie. "Stardust from Saturn: Bits and Pieces of doomed brand live on at GM, elsewhere". *Automotive News*. April 5th, 2010.

at the local level that all hampered its reform efforts. Andrew Inkpen, a scholar who has written several articles on NUMMI, disagrees with my assessment. NUMMI was not a distant and isolated outpost that got lost in General Motors' broader operations, according to Inkpen. Rather, the California plant was central to General Motors' efforts to overhaul their production systems. He notes that G.M. collected data on NUMMI and disseminated the information to the company's greenfield and brownfield plants in Eisenach Germany and Buenos Aires Argentina, Lansing, Michigan and the Orion plant in Detroit.⁸⁴

Inkpen argues that NUMMI's "Technical Liaison Office" (TLO), a managerial organization charged with coordinating training and the transfer of visiting managers, played a critical part helping G.M. overcome barriers to learning from NUMMI. The TLO was designed to individually tailored programs for each manager that cycled through NUMMI including specific line assignments within the plant and maintained a network of NUMMI alumni allowing them to stay connected to each other. Additionally, the TLO maintained an archive of white papers that detailed NUMMI's work system and them made available to the an incoming rotation of G.M. managers.⁸⁵ In Inkpen's analysis, G.M. managers who cycled through both NUMMI and the TLO with the intention of diffusing the experiences with lean production to other General Motors manufacturing facilities across the globe. General Motors' eventual turnaround in the late 90's is related to the institutionalizing of learning and knowledge transfer that began at NUMMI.

Inkpen presents a limited cross-section that does not reflect the complex circumstances surrounding General Motors' efforts to reform its production system. Rather than drawing a smooth line between NUMMI, General Motors' European plants and their eventual embracing of high performance practices, it is important to adopt a larger view of this story, where G.M. launched several experiments simultaneously and with what's most aptly described as inconsistent central coordination. G.M. moved in several policy directions at once, while providing little in the way of consistent leadership or support to its various projects until the creation of Saturn in 1985.

Yet, General Motors' support for co-managing a car brand with the U.A.W. was relatively short-lived. Inkpen's argument does not account for the heterogeneity and often-scattered approach G.M. took applying the managerial and engineering insights gleaned from NUMMI, one that sidesteps considerations of why, besides NUMMI and Saturn, there were no other General Motors plants successfully using a high performance work organization until the late 1990s.⁸⁶

DID NUMMI'S INFLUENCE SPREAD QUICKLY THROUGHOUT G.M.?

Akira Kawahara, Toyota's Chief of Product development in the early 1990s, argues that General Motors understood what changes it needed to make but rather than opting for radical changes necessary, G.M. employed a slow piecemeal approach and slowly diffused a variety of different projects throughout its operations. General Motors' multi-pronged

⁸⁴ Inkpen, Andrew C. "Learning Through Alliances: General Motors and NUMMI". California Management Review. Volume 47, Number 4. Summer 2005. Page 129.

⁸⁵ Ibid., Page 124.

⁸⁶ Inkpen, Andrew. "Knowledge Transfer and International Joint Ventures: The Case of NUMMI and General Motors". Strategic Management Journal. Issue 29, Page 450. 2008

approach to reform produced equally varied levels of success.⁸⁷ The collective bargaining agreements between the U.A.W. and General Motors reflected this cautious flirtation with new work rules, emphasized quality and greater cooperation between the two parties. Each contract, with a few notable exceptions, focused on what collective bargaining agreements typically do such as wages, health care and retirement considerations. While each agreement created new procedures for worker training and committees on quality improvements, the contracts themselves do not actually impose any requirements on individual plants or local unions beyond the creation of bureaucratic procedures.

The 1987 U.A.W./G.M. national collective bargaining agreement created “Operational Effectiveness Committees” that were supposed to identify and recommend specific ways to improve quality and then coordinate with General Motors’ management at the plant and corporate levels to implement changes.⁸⁸ These committees were steps in the direction of competitiveness, but were designed without the authority to implement or enforce any of their provisions. Although the 1987 national agreement built in some flexibility for local unions to modify their work rules, job classifications and even work organization, that does not mean that local parties were willing or particularly eager to make these changes.

The 1990 agreement maintained this motif of local and voluntary modifications and like the 1987 agreement this contract placed responsibility for identifying potential changes at the local level to the JOBS committee. Despite wording in the agreement that acknowledged the need for better quality and new production methods, the contract shifted the burden of deciding and implementing changes onto the local plants and unions. Additionally, the agreement included procedures for including worker’s recommendation where it states, “...local management and local unions should review existing work rules and practices...”⁸⁹ The difference, however, is that the 1987 and 1998 agreements contain voluntary provisions while NUMMI’s are mandated⁹⁰

The 1990 and 1996 agreements contain similar language regarding work process found in the 1987 contract. The 1990 contract, however, created another committee that investigated the best learning technologies for employees, the design of technical manuals and established so-called “skill centers” devoted to the basic educational skills and personal “enhancement” of workers and their spouses.⁹¹ Although the union secured greater funding for the training programs, there remains very little in the details of the 1990 or 1996 agreements that either side was in a rush to make any significant changes to work organization.⁹² Three years later in the 1999 national contract,

The U.A.W. and General Motors launched a program entitled “Operational Excellence” in 1999 that tasked workers in the JOBS bank with finding new ways to streamline production.⁹³ Again, both the U.A.W. and General Motors favored process over results and presumed change should be negotiated not at the national level but at each individual plant, which moved the company in the right direction but failed to produce much change on

⁸⁷ Kawahara, Akira. *The Origins of Competitive Strength: Fifty Years of the Auto Industry in Japan and the U.S.* Springer Publishing. New York. 1998.

⁸⁸ United Autoworkers International. “U.A.W.-GM Report”. October 1987. Page 5.

⁸⁹ Ibid., page 18.

⁹⁰ United Autoworkers International. “U.A.W.-GM Report”. September 1990. Page 14.

⁹¹ United Autoworkers International. “U.A.W.-GM Report”. November 1996. Page 17.

⁹² Ibid., page 17-18.

⁹³ United Autoworkers International. “U.A.W.-GM Report”. November 1999

the ground. Individual “Plant Quality Councils” were comprised of the local union president, a representative from the regional branch of the U.A.W., the plant’s personnel director and others responsible for following through on the national agreement’s call for more flexible work rules, pay for knowledge skill development and where relevant, the use of team-based production methods and various other high performance techniques.⁹⁴ The union secured funding for quality network committees, installed new grievance procedures and added a contractual obligation to provide employees in the JOBS program with “meaningful” work in 2003. Procedures changed, committees changed but one constant in the national collective bargaining between 1987 and 2003 but neither G.M. nor the union were concerned about making specific changes.⁹⁵

Although these agreements encouraged local committees to experiment, there is some inconsistency changes were made and how successful they were. Earnest Schaefer, a former G.M. manager, argues that the earliest attempt to directly duplicate NUMMI’s system occurred in 1986 several hundred miles to the south of Fremont in Van Nuys, California. Schaefer was among the first of many General Motors managers that rotated through NUMMI and hoped his time in Fremont could help transform G.M. Van Nuys, a plant that had a recalcitrant workforce and was the verge of being closed. The Van Nuys plant bore more than a passing resemblance to its Fremont counterpart, having also acquired a national reputation for having a fractious and militant local union and a working environment plagued with inefficiency, poor vehicle quality and absenteeism.

G.M. VAN NUYS: LOGISTICAL FAILURES AND LOCAL ACRIMONY

Van Nuys’ conversion to a lean style manufacturing system failed almost immediately, due in part to the local union’s open hostility to the proposed changes, fearing that a lack of job classifications, seniority and job rotation gave too much authority to management and threatened their job security. Not to be outdone, managers at Van Nuys were not convinced of the merits of Toyota’s system, did not see a need to change and even among those that did, most wanted to maintain strict hierarchal divisions between themselves and line workers. Years before any serious reforms at the plant were made workers at G.M..⁹⁶

The union at Van Nuys had a storied reputation for militancy and sabotage and in a one year period filed 19,876 official grievances against management. It was also not an uncommon for workers to take the chains that pulled vehicles through the plant and weld the line to its own guide rails, effectively bringing the assembly line to an abrupt and immediate halt. This gave workers a few minutes respite as managers frantically searched for the weld.⁹⁷ Though spot welding the line is an extreme example of sabotage, it was more common for workers at Van Nuys to “bank” their jobs, working ahead and filling their queue, then walking around socializing with co-workers at other stations until their queue ran low.⁹⁸

According to Spiegel, Van Nuys’ workers were concerned that Toyota’s production system required fewer workers and would inevitably lead to layoffs. Alternatively, many at

⁹⁴ Ibid., Appendix K.

⁹⁵ United Auto Workers International. “U.A.W. GM and Delphi Report”. September 2003. Page 21.

⁹⁶ Zabala, Craig A. “Sabotage at General Motors’ Van Nuys Assembly Plant 1975-1983”. Industrial Relations Journal. Volume 20, Issue 1. March, 1989. Page 24

⁹⁷ Ibid., page 23

⁹⁸ Ibid., page 26.

the local union simply did not believe that competitive changes were necessary, choosing instead to believe either that G.M.'s threat to shutter the plant was a bluff or that Toyota's production methods were a merely a momentary industrial fad that would soon pass.⁹⁹ Both workers and managers at G.M. Van Nuys had a hostile reaction to changes in the hierarchal organization of the plant preferring instead to maintain separate dining and parking spaces for managers and average workers rather than integrating those spaces as they did at NUMMI.

NUMMI's lean production system had the support and the confidence of its workforce as well as that of its management but, it, would not have been successful without the logistical and engineering support from its network of suppliers. Van Nuys, on the other hand, had none of this. One critical way NUMMI reduced costs was by detecting errors or defective parts early in the manufacturing process. That seemingly elementary idea depends on four other factors: manufacturing in small batches, close relationships with their suppliers, logistical coordination for just-in-time parts delivery, and a highly skilled workforce. Unfortunately, managers at Van Nuys underestimated the extent to which manufacturing inside the plant required active coordination and support from outside firms, presuming they could duplicate NUMMI's system within the facility rather than seeing it as the innermost part of a larger circle of operations. General Motors' network of suppliers already worked with a wide swath of different plants and brands throughout the country and according to Schaefer, were not particularly keen on giving a lone plant in California, "...special treatment". Without that close communication G.M. Van Nuys couldn't receive timely shipments of parts, or get assistance in designing its parts.

More damaging for Van Nuys was that neither workers nor managers agreed to the proposed changes. Workers suspected that team-based production methods and multi-skilling were ploys on the part of management to either intensify their jobs or strip them of hard earned seniority and job classifications. Management at Van Nuys, on the other hand, did not appear keen on many of the proposed changes, as they were reluctant to relinquish some of their authority over work process and standardization, apprehensive of losing their authority throughout the plant. In addition to the technical and engineering difficulties hindering Van Nuys, workers chafed under the new system, perceiving that semi-autonomous work teams multiplied individuals' responsibilities and winnowed away at the employment security rigid that job classifications were designed to protect. Although Van Nuys couldn't replicate NUMMI's success, the plant remained open until the union and General Motors finally agreed to shutter the facility in 1992.

LINDEN, NEW JERSEY: TECHNOLOGICAL ADVANCES AND FAILED PROMISES

Although the Van Nuys experiment fell flat, not all of General Motors' undertakings proved quite that fruitless. In 1986, for instance, the same year as the overhaul of Van Nuys, G.M. invested \$300 million dollars to modernize its manufacturing facility in Linden, New Jersey, in order to replace much of its dated machinery and infrastructure to install a team-based, high performance production system. Unlike Van Nuys, Linden's methods were not designed to duplicate NUMMI, though the two plants' work systems do share a basic framework. General Motors re-opened its New Jersey plant after a year referring the plant as

⁹⁹ "Episode 403: NUMMI". Frank Langfitt. Producer Nancy Updike. [This American Life](#). National Public Radio, WEBZ, Chicago. Aired March 13, 2010. Timecode: 35:00

“New Linden”. The following year New Linden became one of General Motors’ most technologically advanced and efficient plants in the United States, which alone makes it far more successful than the Van Nuys experiment.

According to Ruth Milkman, G.M. focused much of its efforts on upgrading Linden’s aging machinery and increased the number of robots on the assembly line from a single machine in 1986 to two hundred nineteen once the overhaul was complete.¹⁰⁰

Technologically, New Linden was a new plant with state of the art machinery and capabilities shared by only a few facilities within G.M. New machines did not make the plant successful or profitable; but it does suggest New Linden had a lot of potential. Despite the technological advances, neither General Motors nor New Linden’s local management appear to have made commensurate investments in their workforce as conflicts over new work rules and long-simmering tensions within the plant threatened its long-term viability.

Linden’s U.A.W. local encouraged General Motors’ proposals for New Linden, consent management secured by pledging to pair the plant’s technical advances with greater job security, autonomy and skill development. The longitudinal aspect to Milkman’s work illustrates, despite managerial promises to the contrary, New Linden seemed to recreate many of the problems around work process the new system was supposed to ameliorate. Both managers and workers at New Linden chose not to flatten job classifications, apprehensive over what that change might mean for job security and overall working conditions. Additionally, managers had little appetite for delegating authority to the union or work teams throughout the plant. If we understand high performance manufacturing to be an inherently dynamic process, it requires constant refinement and change to the number of job classifications, and promotion of collaboration that allows information to flow throughout the plant and make it easier to implement any necessary changes. Managers bristled at the mere suggestion of parking their car in the same lot or dining in the same hall as workers, much less giving serious consideration to any of their production suggestions. For managers, New Linden’s proposed changes threatened both their stature and authority throughout the plant, thus their apparent reticence toward particular aspects of New Linden.¹⁰¹

Workers, on the other hand, had their own reservations about the direction of the new plant. The local union chose to maintain the previous system of discrete job classifications rather than adopting a flat system because the more traditional system listed hundreds of different positions and roles throughout the plant that represented job security and were jealously guarded. Workers deep mistrust of management helped create what Milkman referred to as “skill polarization” where the conditions for average production workers did not substantively change with the vast majority of extra training and discretion growth remaining concentrated in the skilled trades classifications.¹⁰² Widening gaps in skill and discretion and managers clinging to control exacerbated discontent throughout the plant. General Motors transformed Linden into a modern, high tech manufacturing facility but both G.M. and elements within the U.A.W. invested little in their workforce, neglected skill development, did not broaden worker discretion and did it promote collaboration with management - which were central to NUMMI’s success.

¹⁰⁰ Milkman, Ruth. “Labor and Management in Uncertain Times: Renegotiating the Social Contract”. In *America at Century’s End*. Editor Alan Wolfe. University of California Press. Berkeley, Los Angeles California. 1991. Page 139

¹⁰¹ Ibid.

¹⁰² Ibid., Page 145

Roger Smith succeeded Thomas Smith as CEO of General Motors in 1981 and pursued an aggressive agenda designed to modernize the entire company, restore the company's waning profitability and close the quality and productivity gap with their Japanese competitors. Key to Smith's broader vision was creating the first new division within G.M. in seventy years, one that manufactured vehicles using state of the art technology and the newest innovations in production methods to shepherd G.M.'s business model into the 21st century.¹⁰³ Located in Spring Hill, Tennessee, Saturn was the cornerstone of General Motors' efforts to re-build the company's global competitiveness and had its first car roll of its line in 1990. The various explanations for Saturn's eventual demise are indicative of broader trends of corporate mismanagement, pockets of union resistance and global financial pressures that made change difficult and success, fleeting.

NUMMI's layout and work organization influenced Saturn's design, but G.M.'s planning committee did not rely on a single example to form their new brand. Smith intended for Saturn to transcend NUMMI, not merely replicate it, and as a result he directed the committee to study engineering layouts and work organization from a wide swath of companies and industries. The committee itself consisted of a total of ninety-nine people including local union presidents, workers and various levels of G.M. managers and administrators. This "Committee of 99" indexed more than 30 different G.M. plants (including NUMMI) in addition to surveying the work practices at Ford as well as the production systems at Volvo. The committee also investigated work practices in different, seemingly unrelated companies such as McDonalds and Sony and traveled more than 2 million miles to survey more than 160 different companies and factories to design Saturn.¹⁰⁴ Rubenstein and Kochan note that Saturn's final production and managerial system shares many basic commonalities with NUMMI, but it represented more than grafting a lean-style production system onto an existing facility. Roger Smith hoped that Saturn would not duplicate NUMMI but transcend it by using collaboration as the foundational principle for the entire company.¹⁰⁵

General Motors and the U.A.W. did not merely encourage collaboration with each other; the 1985 agreement contractually mandated that consensus drive the decision-making and resource allocation at every level of the company. General Motors and the U.A.W. created "Decision Rings" or progressively sized groups that govern most aspects of Saturn's operations, with the smallest grouping at Saturn being the work units. Smaller groups of workers consisted of anywhere from 6 to over a dozen members responsible for quality control, housekeeping in their work areas, inventories, job assignments, work planning and scheduling. Worker teams were the were part of larger modules. Modules, in turn, were grouped into three large "business units" – vehicle bodies, powertrains and automotive systems.¹⁰⁶ Rubinstein and Kochan argued that the U.A.W.'s greatest influence in Saturn's day-to-day operations occurred at the module level, where managers overseeing a given

¹⁰³ Ingrassia, Paul. *Crash Course: The American Automobile Industry's Road to Bankruptcy and Bailout – And Beyond*. Random House, New York. 2010. Kindle Edition. Location 2070

¹⁰⁴ Gwynne, S.C. "The Right Stuff". *Time Magazine*. Sunday, June 24th. 2001.

¹⁰⁵ Rubinstein, Saul & Thomas Kochan. "Toward a Stakeholder Theory of the Firm: The Saturn Partnership". *Organizational Science*. Volume 11. Number 4. July-August 2000. Page 371

¹⁰⁶ Rubinstein, Saul & Thomas Kochan. *Learning From Saturn: Possibilities for Corporate Governance and Employee Relations*. Cornell University Press. Ithaca, New York. February 2001. Page 22.

module were paired with union-represented partners. Coupling union and non-union managers placed union workers directly into management positions giving them input into the plant's decision-making but fomenting friendships and collaborative relationships between managers and workers.¹⁰⁷

Saturn's manufacturing, similar to NUMMI, Linden and Van Nuys, was designed around teams of highly trained workers that rotated and shared responsibility for their tasks as a group. One member of Saturn's planning committee, Ms. Danko, described team-based production and job rotation as being the "building block" of the company's production system.¹⁰⁸ Saturn's collective bargaining agreements reduced the number of job classifications and in effect lifted administrative regulations delimiting the types of work each person on the line could do. This approach was not particularly new, but many at the top of the U.A.W. remained skeptical of these changes, arguing that job classifications were hard-won provisions designed to protect workers' jobs, maintain their seniority and prevent management from overworking its staff. Although the controversy around job classifications re-emerged with leadership changes within the U.A.W., Saturn's work teams operated with considerable latitude in designing and performing their jobs.

According to Saturn's collective bargaining agreement, "Work teams will be self-managed; integrated horizontally and reflect synergistic group growth", indicating that although module managers would oversee production generally, it was the team members and leaders who determined how the work on the line was performed.¹⁰⁹ While work teams at NUMMI had some discretion over how to perform their work, any potential changes had to go through administrative channels, either in quality control meetings, suggestion programs or other institutional conduits before new techniques or procedures could be implemented. Saturn's manufacturing process relied to a much lesser degree on strict procedures, instead allowed teams to direct their own activities.

Saturn's workers enjoyed more autonomy and were responsible for quality improvements, scheduling, vacation, budgetary decisions and work methods to name a few.¹¹⁰ In a 1997 study of Saturn by Berkeley labor economist Harley Shaiken notes that although Saturn's manufacturing system bears more than a passing resemblance to Japanese-derived lean production systems such as those used at NUMMI, it is critical not to conflate all high skill, team-based manufacturing systems together; he argues that work teams at Saturn operated not only with truly exceptional levels of latitude, but the co-management structure of the entire company limited the usefulness of any direct comparisons with other high performance facilities. According to Shaiken's analysis, Saturn combined skilled, team production with co-management that contributed to the plant's early successes.¹¹¹

Having such a range of responsibilities and tasks required workers be not only experienced but have access to on-going training. Some workers often sat through 600 hours of training before assembling anything at Saturn, in addition to setting aside a small

¹⁰⁷ Ibid., Page 53.

¹⁰⁸ 251 F.3d 573 (6th Cir. 2001)

¹⁰⁹ U.A.W.-GM. "Memorandum of Agreement". Saturn. 2000. Page 8.

¹¹⁰ Shaiken, Harley. Steven Lopez. "Two Routes to Team Production: Saturn and Chrysler Compared". *Industrial Relations*, Volume 36, No. 1. January 1997. Page 28.

¹¹¹ Ibid., page 44

percentage of their total working hours every year for off the line training.¹¹² The topics of their training spanned troubleshooting and team organization to industrial engineering, accounting and statistical process control.¹¹³ Saul Rubinstein, a scholar who has written extensively on Saturn has argued that the new company allowed for "...greater lateral flexibility on the part of labor and more vertical involvement of labor in decisions previously reserved for management".¹¹⁴

SATURN'S DEMISE: HOW IT LOST SUPPORT FROM THE PARENT COMPANY AND THE UNION

Saturn received quick praise when a year after coming online it was among the most efficient of General Motors' plants in the United States and received high marks for product quality, productivity and customer service.¹¹⁵ Using standard industry metrics, Saturn's early years were remarkably successful, receiving recognition for product quality, consumer satisfaction and productivity, counter-indicating notions that G.M. lacked the technical wherewithal to become more competitive. Two years into production, J.D. Power and Associates ranked Saturn at the top in overall customer satisfaction for domestic automakers. Two years later in 1994, Harbour and Associates noted Saturn ran a tight operation that averaged 3.65 workers per vehicle (wpv), which made it one of G.M.'s most efficient plants¹¹⁶. The reasons for Saturn's exceptional performance follow a familiar tack. Saturn was governed by its own collective bargaining agreement. It was co-managed by the U.A.W. and General Motors. The plant used cutting edge technology, lean-style work organization and a highly trained workforce. It used dedicated suppliers that ensured consistent logistical support. Saturn had every ingredient that was lacking at Van Nuys, CAMI, SIA, New Linden and even NUMMI.

Nonetheless, some managers at General Motors balked at Saturn's \$5 billion dollar price tag, did not see the importance of producing fuel-efficient cars and were suspicious of treating the U.A.W. as a partner. Traditional leadership within the United Auto Workers had reservations of their own. This political branch of the U.A.W., led by Stephen Yokich, was suspicious of Saturn's flat job classifications, how it cross-trained its workers and its flat wage structure. Finally, many within the U.A.W. simply did not trust General Motors and fought hard to prevent Saturn's work organization from being applied elsewhere.

Saturn showed that no manufacturing facility, no matter how efficient, could continue operating without the support of the parent company. G.M. and the U.A.W. did not withdraw

¹¹² Chappell, Lindsay. "Friction in Spring Hill; Saturn socked for importing workers". *Automotive News*. November 5th, 1990. Page 1.

¹¹³ Rubinstein, Saul & Thomas Kochan. *Learning From Saturn: Possibilities for Corporate Governance and Employee Relations*. Cornell University Press. Ithaca, New York. February 2001. Page 35.

¹¹⁴ Rubinstein, Saul A. "Unions as Value-Adding Networks: Possibilities for the Future of U.S. Unionism". *Journal of Labor Research*. Volume 32, number 3. Summer 2001. Page 584.

¹¹⁵ Cohen, Morris & Carl Cull & Hau Lee & Don Willen. "Saturn's Supply-Chain Innovation: High Value in After-Sales Service". *MIT Sloan Management Review*. Summer 2000. Pages 93-101.

¹¹⁶ Novak, Sharon & Fine, Charles. "Fitting Teams to the Task: Product Development Vs. Operations Improvement at Saturn and NUMMI". *Sloan School of Management*. MIT. February 1996. Page 8

their support overnight. Rather both parties gradually divested from Saturn over several years until the company was merged into General Motors in 2003.

The recession of 1991 hit General Motors hard as the company posted a \$6 billion dollar loss at the end of year despite selling more than 4 million vehicles and tallying \$94 billion dollars in sales worldwide.¹¹⁷ Fortunately for G.M., its global vehicle sales improved the following year in 1992, tallying similar sales in North America (4.3 million vehicles sold), but recording \$102.8 billion in net sales.¹¹⁸ G.M. posted \$3 billion dollars in losses in 1992 that was less than half of the figure in 1991. In 1995, G.M. posted a modest profit of \$1.6 billion dollars globally on \$107 billion dollars in sales.¹¹⁹

Sales numbers from Saturn's first years were remarkably good given the circumstances. In 1991, for instance, Saturn tripled its sales between February and May going from two thousand vehicles sold to almost seven thousand. Sales reached a high of 9,257 vehicles in October that same year. Despite this growth Saturn still lagged behind other G.M. nameplates by a considerable degree. With an economy in the early stages of recovery, Saturn's sales numbers considerably improved in 1992 as dealers tallied more than 13,000 vehicles sales in February of 1993, besting the previous year's sales high by 41% and reach a high of more 22,300 sales in July.¹²⁰

General Motors made gains on its competitors: its sales were picked up and quality benchmarks placed NUMMI and Saturn on par with the most efficient auto plants in the world. Yet, Saturn's early successes were short lived as the downturn exacerbated existing tensions between General Motors and the U.A.W. over the future direction of Saturn. Despite recovering vehicles sales and profits, General Motors and the U.A.W. halted plans to expand Saturn's production output for two years, which throttled Saturn's profitability at a critical juncture in its development.¹²¹ Accounts from former Saturn and G.M. executives note that there was a simmering antagonism toward Saturn within General Motors from the very beginning that found a listening audience in the U.A.W. with the ascending of Stephen Yokich in 1994 and 1995.¹²²

Softening political support within the U.A.W. was apparent by at least 1993, Stephen Yokich, not one prone to ambiguity, wrote to the President of Saturn's local -Mike Bennett- and expressed his desire to alter Saturn's entire work system including its job classifications, supplier arrangements, wage system and decision-making procedures.¹²³

As Vice President of the U.A.W., Stephen Yokich brought his considerable clout to bear on reigning Saturn. Leading a more traditional group within the U.A.W., Yokich staunchly believed in the merits of the U.A.W.'s national collective bargaining agreement;

¹¹⁷ General Motors. *Annual Report to the SEC*. Fiscal Year 1994. Pages 53, 54.

¹¹⁸ Ibid.

¹¹⁹ General Motors. *Annual Report to the SEC*. Fiscal Year 1994. Pages 53, 54.

¹²⁰ S&P Daily News. "General Motors Corporation". July 1992.

¹²¹ Chappell, Lindsay. "Empty Nest; Saturn to tackle next ten years on its own". *Automotive News*, November 1st, 1993.

¹²² "Saturn: A Wealth of Lessons from Failure". Case Study. The Wharton School, University of Pennsylvania. October 28th, 2009. Can accessed at www.knowledge.wharton.upenn.edu/article.cfm?articleid=2366

¹²³ Chappell, Lindsay. "U.A.W. Beats the Drums for War on Saturn Labor Rules". *Automotive News*, May 31st, 1993.

arguing that Saturn's provisions on work teams, cross-skilling and broad job classifications directly undermined provisions in the national agreement.¹²⁴ Yokich targeted Saturn's flexible work scheduling in 1993, forcing the issue to a vote in the plant three separate times before in 1994 it was eliminated in favor of traditional scheduling.¹²⁵ Though it was a relatively small issue Yokich and Mike Bennett understood the potentially slippery slope Saturn was on.

Saturn and its workers were in precarious circumstances after Yokich won the U.A.W. Presidency in 1995. The following year, both the union and G.M. delivered a significant blow to Saturn as the shifted production of Saturn's second-generation vehicles to G.M.'s plant in Wilmington, Delaware, which was covered by the national agreement.¹²⁶ Not only did both G.M. and the union halted Saturn's expansion, delayed upgrading Saturn's product line and shifted production to another plant. Additionally, General Motors and the U.A.W. bracketed plans to produce a fuel-efficient sedan apart from its operations at Saturn¹²⁷. According to the 1993 collective bargaining agreement clearly states, "Such a vehicle could be powered by gas or electricity and would be separate from Saturn operations".¹²⁸

Blame for Saturn's decline should be lumped entirely on the U.A.W.. General Motors' commitment to Saturn was evaporating as early as 1992 as well. That year, G.M. reduced its fixed costs in all aspects of its work and started with its suppliers, which was a move the U.A.W. supported.¹²⁹ General Motors adopted a modular approach in order to reduce the number of outside companies it worked with. It created a committee entitled the "Program for Improvement and Cost Optimization of Suppliers" (PICOS) that slashed the total number of suppliers on contract, signed the remaining companies to long-term contracts, secured price guarantees and switched to single source suppliers for multiple companies. This policy shift marked the end of Saturn's system of dedicated suppliers.

Saturn's tier-1 suppliers did more than just supply the plant with components; they synchronized production with Saturn, independently designed their parts and assisted in re-designing defective parts. Saturn stood out among G.M.'s other brands in this regard, because they collaborated with only three hundred suppliers whereas the typical General Motors plant worked with over a thousand different supplier companies on average and many of their partners were locked in exclusive, long-term contracts with Saturn.¹³⁰ Factions within both the U.A.W. and General Motors were suspect of Saturn because many of its suppliers were not organized by the union or they were located in Japan or worked exclusively with Saturn.

Saturn's supplier contracts were jeopardized in the years following 1993 as the United Auto Workers won progressively more input into decisions over General Motors' supplier

¹²⁴ Ingrassia, Paul. "Saturn Couldn't Escape G.M.'s Dysfunctional Orbit: Union Leaders Hated the Flexible Work Rules and Eventually got rid of them". Wall Street Journal. Opinion. October 2, 2009.

¹²⁵ Ingrassia, Paul. *Crash Course: The American Automobile Industry's Road to Bankruptcy and Bailout – And Beyond*. Random House, New York. 2010. Kindle Edition. Location 2258. Page 128.

¹²⁶ Kochan, Thomas A. "Rebuilding the Social Contract at Work: Lessons from Leading Cases". MIT Sloan School of Management. Task Force Working Paper #WP09, May 1st, 1999.

¹²⁷ Ibid.

¹²⁸ United Auto Workers International. "U.A.W.-GM Report". October 1993. Page 10.

¹²⁹ Chappell, Lindsay. "GM Combs Saturn Suppliers for New Players". Automotive News. August 24th, 1992. Page 38.

¹³⁰ Rubinstein, Saul & Thomas Kochan. "Toward a Stakeholder Theory of the Firm: The Saturn Partnership". Organizational Science. Volume 11. Number 4. July-August 2000. Page 372.

sourcing. The new agreement required that G.M. share a “master list” of all non-union suppliers and notify plants that could be negatively affected to allow the union time to demonstrate that the work could cost-effectively be done in-house¹³¹. The U.A.W. had enough procedural and administrative influence to ensure new and existing supplier work either stayed in-house or was outsourced to U.A.W. supported plants. While this policy may have bolstered job security for some of the U.A.W.’s workers, it came at the expense of Saturn’s operations.

By 2003, General Motors and the U.A.W. shifted production away from Spring Hill, eliminated Saturn’s suppliers, absorbed its administrative decisions, changed its work rules, developed fuel-efficient cars to other brands and left with an aging product line in desperate need of updating.¹³² In 2003, G.M. had also moved significant portions of Saturn’s Spring Hill production over to tier one-supplier companies and effectively removed a key pillar of job security for those employees.¹³³ Second, G.M. and the U.A.W. issued a joint five-year plan to move the future production of Saturn’s long-promised SUV to G.M.’s plant in Wilmington Delaware, away from the Spring Hill plant.

There appears to have been two reasons for this plan: first, management at the top of General Motors saw Saturn as too costly and unnecessary given their rising truck and SUV sales in the 1990s. The U.A.W., on the other hand, had multi-faceted reasoning. First, the U.A.W. agreed to move production to General Motors’ Wilmington plant as an alternative to closing it as G.M. proposed. The U.A.W.’s compromise hurt Saturn but it allowed both plants to remain online and prevented thousands of workers from entering the JOBS bank. Second, leadership changes at the top of the U.A.W. were simply hostile to Saturn.¹³⁴ The election of Steven Yokich as the Union’s President, re-heated a long-simmering skepticism within the union about expanding many of Saturn’s contract provisions for flexible work rules and lower wages to other plants.¹³⁵ Rubinstein cautions that it would be misguided to argue that the United Auto Workers were uniformly against Saturn, because after all they co-authored the original agreement for Saturn. Workers at U.A.W. local 1853 voted to return to the standard national contract in 2003, effectively ending the Saturn experiment in co-management. 2003 marks the official end of Saturn in its original design and intent and there is sufficient evidence showing that the active support from both the U.A.W. and General Motors waned considerably since the early 1990s, with subsequent national agreements progressively cleaving away at the policies and industrial practices that made Saturn, at least initially, markedly successful.

Production figures between 2000 and 2009 show a consistent decline in Saturn’s car production and a concurrent rise in production of the Vue and Outlook sport utility vehicles, indicative of G.M.’s over indulgence in that segment through the 2000s. In other words, sales and production figures show that we should not disassociate Saturn’s increasing isolation

¹³¹ United Auto Workers International. “U.A.W.-GM Report”. November 1996. Page 6.

¹³² Gardner, Greg. “Is this the End of Saturn?”. Ward’s Autoworld, September 1st, 1998.

¹³³ Ward’s Autoworld. “More Discontent at Saturn; Outsourcing for Future SUV at Issue”. August, 1st, 1998.

¹³⁴ Rubinstein, Saul & Thomas Kochan. *Learning From Saturn: Possibilities for Corporate Governance and Employee Relations*. Cornell University Press. Ithaca, New York. February 2001. Page 111

¹³⁵ Ingrassia, Paul. “Saturn was supposed to save G.M. – Instead G.M. Crushed Saturn: Here’s how”. Newsweek, April 13th, 2009.

from General Motors and the U.A.W. from the company's broader shift toward Sport Utility Vehicles in the mid to late 1990s. The year 2001 marked the high point for Saturn's vehicle production, manufacturing 275,000 cars. The following year Saturn introduced the Vue sport utility vehicle concurrently producing 31,000 fewer cars while its SUV production hit its stride in its first full sales year, producing 87,800 trucks in 2002.¹³⁶ In 2003, Saturn increased production of the Vue by 11,500 vehicles while production figures from Saturn's passenger cars slid by 25% (183,000) from the previous year. The downward slide in car production continued in 2004 as Saturn produced 122,600 cars and a record of 108,000 sport utility vehicles. Notwithstanding a small increase in car and truck production in 2006, Saturn manufactured progressively fewer cars until in 2007 when they turned out a mere 103,000 cars, which was a 73% drop in only six years. Saturn fell in J.D. Powers and Associates 2006 Initial Quality Study below fellow G.M. brands Cadillac, GMC, Lincoln and Chevrolet.¹³⁷

General Motors focused sport utility vehicles and left brands like Saturn low on the company's list of priorities. Second, Saturn's slow demise is plainly evident and the precipitous slide after 2003 was not surprising after G.M. and the U.A.W. unbraided Saturn's supplier relations, delayed developing new models and products in competitive market segments, limited the company's input on engineering and product design, sourced new vehicles elsewhere and dissolved the original 1985 labor contract in 2003. It was gradual and deliberate.

Despite the convoluted road to competitiveness that it took, General Motors declared bankruptcy in 2009. General Motors' restructuring required the dissolution of Saturn. According to a report compiled for Congress on the bailouts of the auto industry, "GM's plans also include sale or downsizing of four out of their eight current brands, with Hummer, Saab, Saturn, and Pontiac not being considered as 'core' future brands".¹³⁸ Though regrettable, even the staunchest of Saturn supporters conceded that the company had long lost its viability given the economic meltdown, Saturn's \$5 billion dollars in accumulated losses and the piecemeal dismantling of the company over the previous decade. The intent behind Saturn was to invest in cutting edge technology and managerial strategies that would inform changes throughout the rest of G.M. But this goal was lost along the way. Additionally, Saturn was an investment by General Motors in manufacturing smaller, more fuel-efficient cars, a goal that was quickly jettisoned in the 1990s as low oil costs and high SUV sales made Saturn seem less important. In the end G.M. had learned nothing from its failures of the 1970s and ended up in the same bind as it had in the 1980s with uncompetitive production methods and unsalable white elephants.

NUMMI AND THE GLOBAL MANUFACTURING SYSTEM

Returning to the argument I introduced at the beginning of this chapter, Andrew Inkpen argued that General Motors recognized early on the potential for NUMMI to dramatically alter how it manufacturers vehicles and administered a program to circulate

¹³⁶ S&P Daily News. General Motors Corp. 2002

¹³⁷ J.D. Powers and Associates. "Redesigned Initial Quality Study Shows that Vehicle Design Plays a Critical Role in Consumer Perception of Quality as Defects and Malfunctions". J.D. Powers and Associates Reports. June 7th, 2006.

¹³⁸ Cooney, Stephen et al. "U.S. Motor Vehicle Industry: Federal Financial Assistance and Restructuring". Congressional Research Service. January 30th, 2009. Page 4.

knowledge from NUMMI throughout General Motors. The “technical liaison office” as it was called recruited plant managers and industrial engineers from all over General Motors to spend months working and learning at NUMMI. It was perhaps the optimistic hope that veterans of NUMMI would fan out across General Motors and implement changes at their home facilities that over time would slowly change the direction of G.M.

G.M. initiated a number of changes at its American plants partially in response to NUMMI; it just was not very successful at it. Additionally, while NUMMI informed most of these efforts as Inkpen suggests, rarely was the Fremont plant the sole or even the primary influence and most importantly, General Motors’ application of these methods was plagued by resistance both within and outside the company. General Motors’ Opel plant in Eisenach, Germany bears perhaps the strongest connection to NUMMI, as the managers and officials that designed the facility not only drew directly from NUMMI’s technical layouts but sought managers and officials that had experience working at the Fremont California plant. Opel’s Eisenach’s plant importance lies both in its kinship to NUMMI and in its pivotal role in what G.M. eventually termed its next generation, “Global manufacturing system”. Eisenach’s officials emphasized the team-aspect and worker flexibility of the facility’s production system and organized its workers into over 200 separate work teams. Each of these teams consisted of between six and eight members, with each group assigned responsibility for specific parts or areas of the production process.¹³⁹ Rather than having managers oversee and coordinate production at Eisenach, team leaders had wide discretion to organize team production schedules, housekeeping duties and ensuring high levels of product quality. Individual workers within teams at Eisenach were allowed to re-structure their work and in conjunction with other workers created overlapping layers of oversight throughout the plant. For their part, management tried to instill a sense of involvement among workers, to make them feel their contributions would be heard and implemented.

Surveys of worker satisfaction and involvement at Eisenach indicate that 98% of workers in 1996 reported high levels of on-the-job satisfaction and posted a daily absentee rate of only 3%.¹⁴⁰ Not only did Eisenach have satisfied workers and low absenteeism, but it was among the most efficient plants in Europe in only two years, requiring the fewest man-hours per vehicle. It should be noted, however, that part of their higher productivity in the first several years of operation is derived from having only one model to produce.¹⁴¹ Second, Eisenach was also less vertically integrated than similar facilities and relied to a greater degree on its first tier suppliers and had larger buffers for certain parts than either NUMMI (upon which its based) or its peer European facilities.¹⁴² Finally, General Motors established a liaison office that organized the cycling of managers from other plants through Eisenach for experience in a similar fashion to NUMMI’s TLO.

¹³⁹ Haasen, Adolf. “Opel Eisenach: Creating a High Productivity Workplace”. *Organizational Dynamics*. Spring 1996. Page 82

¹⁴⁰ Kurlyco, Diana T. “Once-Grimy Eisenach Becomes Opel’s Jewel”. *Automotive News*. November, 11th, 1996. Page 42A.

¹⁴¹ *Ibid.*, page 42A

¹⁴² Tolliday, Boyer, Charron & Jurgens. “Introduction: Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry”. In *Between Imitation and Innovation: The Transfer and Hybridization of Productive Models in the International Automobile Industry*. Ed. Robert Boyer, Elsie Charron, Ulrich Jurgens and Steven Tolliday. Oxford University Press, UK. January 1999.

Although Eisenach is largely derivative of NUMMI, there are key contextual differences between the facilities that are worth mentioning. Managerially, half of the total seats on Eisenach's governing board are reserved exclusively for worker representatives. This is a major distinction in managerial strategies between the two facilities, as the intra-firm trust required for high performance manufacturing at Eisenach was enforced through a work council while NUMMI's was contractually bargained. Furthermore, issues of contention here in the United States such as employee health care and retirement costs, were not major sticking points in Germany due to the country's refined social welfare system.

NUMMI deserves credit for pioneering certain techniques but this linear transfer of social capital from NUMMI to Eisenach to the rest of G.M. was a long, expensive, two-decades long process fraught with inconsistencies, corporate and union resistance and failed experimentation. William Holstein notes there was not broad recognition within General Motors of NUMMI's importance much less an upwelling of support for broader production reforms.¹⁴³ Quite the contrary, General Motors' eventual embrace of lean production techniques was due not to broad consensus within G.M. but rather resulted from the concerted efforts of several key individuals that brought the insights from NUMMI and other plants to bear on new manufacturing plants in Europe and Latin America.

Lou Hughes, the head of General Motors' European operations in the early 1990s, was one of the few high level officials that recognized the importance of adopting large portions of NUMMI's production system to new and pre-existing plants. In 1990, shortly after the end of the Cold War, Hughes bought an aging manufacturing facility in the former East Germany, transforming it into General Motors' new Opel plant. According to Holstein, Hughes hired people to manage his new plant who had substantive exposure to Japanese production techniques, choosing a man named Tom LaSorda to head Eisenach. Prior to his appointment at Eisenach, LaSorda was an assistant plant manager at CAMI, G.M.'s lean production plant in Ontario, Canada, and who had previously spent time as a visiting manager at NUMMI. Following Hughes admonishment, LaSorda hired managers and skilled tradespeople with experience in Japanese production techniques, some of whom came from NUMMI, CAMI or Toyota transplants in the Southern United States.¹⁴⁴

Gary Cowger, former President of G.M.'s North American Division and head of its International Manufacturing program, played a crucial role fusing the techniques of NUMMI, CAMI and Eisenach in the forging of General Motors' Global Manufacturing System. Like Lou Hughes and Tom LaSorda, Gary Cowger was a veteran of Japanese production techniques, having spent time on the production floor of both NUMMI and CAMI before heading up General Motors' division on global manufacturing.¹⁴⁵ Cowger and his team drew on their individual experiences at NUMMI, CAMI and Eisenach to design a new system that wedded a modular approach to production with standardized methods and supplier relations across all platforms to increase quality and decrease costs throughout General Motors.¹⁴⁶ Lou Farinola, head of General Motors' Global Manufacturing System program from 2002 to 2007, described this new system as turning on five axes: built-in quality, lean material flow in and outside the plant, continuous improvement and the involvement of workers in the production

¹⁴³ Holstein, William J. *Why G.M. Matters: Inside the Race to Transform an American Icon*. Walker and Company. New York. 2009. Kindle Edition. Location 1319.

¹⁴⁴ Ibid., Location 1345

¹⁴⁵ Ibid., Location 1311

¹⁴⁶ Wardsauto.com "GM: Manufacturing System Paying Off". May, 21st. 2001.

and decision-making process.¹⁴⁷ Conceived by a group of managers and G.M. officials in 1992 and formally announced in 1996, the new system was initially used in Greenfield sites in other countries and eventually found its way into stateside manufacturing facilities.

Jack Smith, General Motors' then CEO, implemented this modular production system at several Greenfield facilities in Poland, China, Argentina and Brazil, with most of the facilities coming online in the late 1990s and early 2000s. Due in part to G.M.'s new Global Manufacturing System, the 1999 Harbour report named General Motors the most improved company, noting their 8.8% jump in year over year productivity.¹⁴⁸ Yes, NUMMI's methods were grafted to some degree onto G.M. plants globally, but stateside plants did not widely adopt this new system until 2002. The General's new production system had an appreciably positive impact on the company's overall quality, by one measure resulting in 85% fewer vehicle recalls between 2004 and 2008.¹⁴⁹ According to the report,

In engine, much like in stamping, GM Powertrain has stayed with its plan to establish a global manufacturing system to drive competitiveness....The results have been apparent over the last few years but never more noticeable than in 1999.¹⁵⁰

Industry analysts have noted the role the global manufacturing system played in closing of the quality gap between General Motors and its competitors. General Motors found that implementing a high performance work system turns on at least four separate axis including: active support and guidance from General Motors corporate, the U.A.W. International, design and logistical support from supplier companies and perhaps most obviously, these systems won't work efficiently without the contributions as well as the sustained confidence of plant level managers and workers. Binding these factors together is very difficult and success is anything but guaranteed.

¹⁴⁷ Shook, John. "G.M. Lou Farinola responds to 'Why Hasn't G.M. learned from NUMMI?'"'. Lean Enterprise Institute. 2009. Can be accessed: www.lean.org.

¹⁴⁸ "Harbour Report: G.M. Most Improved in 1999". Wardsauto.com. June 19th, 2000.

¹⁴⁹ Shuldiner, Herb. "GM Global Manufacturing System Guarantees Quality, Shaves Costs". Wardsauto World. November 5, 2008. Wardsauto.com

¹⁵⁰ "2000 Harbour Report". Ward's AutoWorld, July 1st, 2000.

**CHAPTER IV: IT IS MORNING IN AMERICA:
THE DEMISE OF GENERAL MOTORS, THE RECESSION AND THE DAWN OF AMERICAN
AUSTERITY**

Despite a record of high productivity and quality as well as an innovative work system, the future of NUMMI became shaky in 2009. As the global economy sunk into recession the year before, plummeting consumer confidence and a lack of global liquidity evaporated demand across all industrial sectors, including automotive purchases. Industry wide, sales dropped to a 28-year low, falling 41% between February of 2008 and February of 2009 across the entire industry.¹⁵¹ General Motors, already struggling with tens of billions of dollars of debt and as much in unfunded liabilities, found itself in an especially alarming position as its sales declined 53%. Ultimately, CEO Rick Wagoner was forced to consider the real probability of bankruptcy. The potential consequences of bankruptcy were certainly not lost on the workers and leadership at the NUMMI plant, many of whom understood that their jobs in particular, would be in jeopardy as G.M. at the time was only producing the Pontiac Vibe at NUMMI, ceding much of the facility's available production capacity to Toyota.¹⁵²

General Motors withdrew from NUMMI citing its post-bankruptcy plan to streamline the company, which set into motion events that caused NUMMI's closure. Toyota followed General Motors' lead and announced its intention to halt operations at the plant. Toyota resisted calls from California elected officials and members of the Blue Ribbon commission to shift production from Japan to the United States to reduce its excess capacity rather than shuttering NUMMI and laying thousands of workers off. NUMMI was a plant caught in the slipstream of global financial forces and the poor decisions of its parent companies. Following NUMMI's closure, several scholars and industry analysts posited that in addition to the pressures of a depressed global economy the story of G.M.'s and NUMMI's decline was linked to G.M.'s health care and legacy costs.

Roger Lowenstein, a former reporter for the Wall Street Journal argued in his book, *The Aging of America* that the U.A.W. muscled gratuitous pension and health care guarantees from General Motors. It was these legacy costs that were primarily at fault for G.M.'s bankruptcy. Lowenstein's suggestive tone throughout the book venerates Walter Reuther and the hard scrabble origins of the U.A.W. and in the process, frames the contemporary organization in sharp relief as the petulant offspring of Reuther, privileged and unaware of the demands and sacrifices required for success in an increasingly competitive global economy. His unflattering view of the U.A.W. and G.M. has acquired quite an impressive following in the popular and industry press, with General Motors becoming the most recent example of all that's wrong with American manufacturing. Because of globalization, the argument goes, American corporations cannot afford the massive health care and pension obligations that unions typically demand, General Motors being the prime example of this. Arguments like Lowenstein's are persuasive because legacy costs do burn through a company's cash and can ravage their balance sheets, particularly in a severe downturn. Moreover, the concept is easy to communicate and grasp. While Lowenstein's argument highlights the severe financial

¹⁵¹ Vlastic, Bill & Nick Bunkley. "Already Bleak, Auto Sales Take a Fall in February". New York Times. March 3, 2009.

¹⁵² Goll, David. "Fremont NUMMI Plant Braces for G.M. Fallout". Silicon Valley/San Jose Business Journal. April 10, 2009.

effects of legacy costs on General Motors, evidence suggests that the events surrounding G.M.'s slide into bankruptcy also involved decades of poor decisions and investments by the firm's executives, savvy competition, and the dizzying meltdown of the global financial system.

I argue in this chapter that the demise of NUMMI cannot be properly analyzed apart from the actions and financial condition of one of its parent companies. This is part of my broader argument that no manufacturing facility can survive, no matter how productive or efficient, without a financially viable parent firm. Plant level considerations of communication, skill development, logistical support and committed and skilled workers—all critical factors for success--will not alone secure American manufacturing competitiveness. Market analysts and scholars have noted significant structural problems at General Motors for quite some time. The corporation's own records indicate it over-invested in Sport Utility Vehicles during the 90s, failed to develop a more fuel-efficient line up of vehicles for a changing market, and had excess capacity and production volumes since 1998. Additionally, G.M. carried tens of billions of dollars in debt and unfunded liabilities.

It tends to go understated in the literature, however, that in addition to its long-term structural problems, General Motors started a side business in mortgage finance in 2000. Less than two years later, G.M.'s former subsidiary, General Motors Acceptance Corporation (GMAC), originated and sold hundreds of billions of dollars in mortgage-backed assets. GMAC, as it turns out, had functionally inadequate assets to back-up the scale of its debt and the collapse of the American housing market initiated a cascading series of events wherein GMAC plunged into insolvency and dragged an already struggling General Motors down with it. Eventually NUMMI paid the price of this debacle as well.

HEALTH CARE AND PENSION COSTS

Although General Motors was being pressured on multiple fronts, the company's health care and retirement costs became increasingly critical. Lowenstein's analysis identifies three inter-related causes for the high cost of G.M.'s costs in these two areas: first, General Motors yielded to the United Auto Workers on compensation without paying proper attention to the long-term actuarial responsibilities they were agreeing to. Second, G.M. drastically underestimated the sheer number of people they'd ultimately be responsible for. Third, G.M. agreed to these costly benefits as their sales and market share were in slow but steady decline, or in other words at the worst possible time. Looking first at the scale of the problem, entering the 2007 contract negotiations with the U.A.W., G.M. was financially responsible for over four hundred thousand retired employees in addition to one hundred eighty thousand current employees. When we factor in relatives and dependents of current and former workers estimates of the number of people tied to G.M. range from 775,000 thousand people on the low end to as high as 1.1 million people in total.¹⁵³

The actual figures for General Motors' health care and retirement costs were staggering. Lowenstein notes some rather sobering statistics, perhaps chief among them being that at the end of 2005, General Motors' pension and health care obligations came with a price tag of

¹⁵³ Lowenstein, Roger. *While America Aged: How Pension Debts Ruined General Motors, Stopped the NYC Subways, Bankrupted San Diego, and Loom as the Next Financial Crisis*. The Penguin Press. New York, 2008. Kindle Edition. Location 1194

\$195 billion dollars.¹⁵⁴ Lowenstein is technically correct, but it is important to note that this hefty price tag was not the amount G.M. owed immediately, rather it is how much the automaker was supposed to pay eventually over several decades. Because this \$195 billion dollar figure represents costs stretched over such a broad time horizon, we need to use a different set of metrics for determining the effects of pension and health care in a more immediate way.

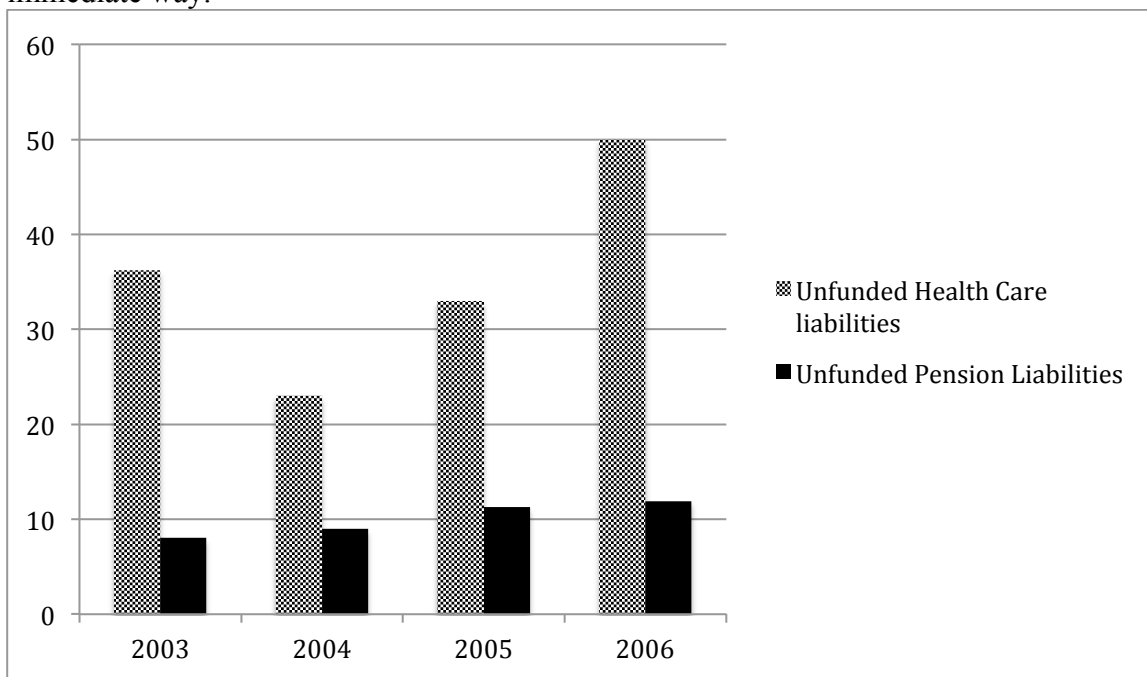


Figure 3: In billions of dollars Source: General Motors Annual Shareholder Reports

Breaking down the annual statistics into their constitutive elements complicates Lowenstein's narrative. Through most of his text, Lowenstein used the term "legacy" to refer to both pension and health costs as a single, uniform cost. Conflating these items under the banner of "legacy costs" is convenient for readers but obscures the fact that pensions and health care are two distinct variables, whose costs rise and fall for different and often unrelated reasons. The dissimilarity between these expenses and their relative impact on G.M. are outlined quite clearly in their sets of annual reports, all of which show a sharp and appreciable divergence between the costs of providing health care relative to pensions.¹⁵⁵

Looking first at pensions, between 2002 and 2007, G.M. spent an average of \$6.1 billion dollars a year on pension costs. As a point of comparison, G.M.'s annual outlays for health care average \$4.8 billion dollars over the same five-year time period. These numbers appear to confirm both of Lowenstein's major points, that health care and pension costs together siphoned cash away from the company. Yet, according to General Motors' annual report the distinction between the two costs becomes very apparent. In 2005, G.M. reported that they

¹⁵⁴ Lowenstein, Roger. *While America Aged: How Pension Debts Ruined General Motors, Stopped the NYC Subways, Bankrupted San Diego, and Loom as the Next Financial Crisis*. The Penguin Press. New York, 2008. Kindle Edition. Location 1120

¹⁵⁵ See Figure 1

underfunded their pension investments by \$11.3 billion dollars. That's a staggering amount of money, but as a point of comparison the company's unfunded health care liabilities weighed in at over \$33 billion dollars.¹⁵⁶ In 2006, G.M.'s unfunded health care liabilities continued to outpace their pensions, with the gap between the two widening to \$38.1 billion dollars, with pension liabilities remaining steady while health care liabilities soared to slightly over \$50 billion dollars.¹⁵⁷ This is rather indicative of the larger divergent trend between these two variables that persisted through most of the decade. The company's health care liabilities have exploded in the past ten years while their pension expenditures and liabilities have remained high, but consistent.

Though there's some variation, through the early-to-mid 2000s, G.M.'s health care liabilities were already three times as underfunded than their rapidly evaporating pension investments, which is suggestive of several broader trends. Lowenstein adds that General Motors' investments had abnormally low returns due primarily to the easy-money, low interest rate environment of the early 2000s, which of course applies to all its investments and not just those related to pension or health care. If low interest rates and inadequate funding were the only reasons, however, we'd be more likely to see unfunded health care liabilities somewhere close to that of pensions, but that is not what we're seeing in the data.

There are several more plausible explanations available: first, retiree pensions and health care costs are funded in different ways, which can explain some of this noted discrepancy. Retired autoworkers already contributed a portion of their yearly incomes to their pension (in part by regular contributions and in part by accepting lower wages) over the span of their careers with G.M. in return for more robust retirement security. General Motors' health care liabilities do not share that level of standardized contribution due in part to the growing imbalance between General Motors' active and retired workforce. General Motors, in 2005, was responsible for the retirement costs for two and a half retirees for every worker it employed, paying out more than \$5 billion dollars in health care expenditures that year.¹⁵⁸ As Taylor highlights, a disproportionate share of the financial burdens of rising health care costs and a large base of retirees were being shouldered by General Motors' current smaller workforce, in turn, contributing to the company's rising unfunded liabilities.

A second plausible explanation is that yes G.M. under-funded health care and pension funds and yes low interest rates minimized investment returns but the cost of providing health care itself, separate from pensions, has skyrocketed over the last 15 years, which of course neither G.M. nor the U.A.W. had any control over. This discussion of health care costs and liabilities is often glossed over by industry analysts and some of the more politicized commentaries. G.M.'s shareholder reports have consistently noted that the costs of providing health care is appreciably more expensive than its pension costs over both the short and long term horizons and they continue to rise. Lowenstein's argument, being indicative of the tone of the larger debate, blames the automaker's rising health care on its workers being overweight, smoking too much and personal negligence. This particular aspect of Lowenstein's argument is misleading because rather than addressing distorted health care markets in the United States it focuses on the habits of U.A.W. workers. For example, he wrote,

¹⁵⁶ General Motors Corporation. *Annual Report to Shareholders*. Fiscal Year 2005. Page 102

¹⁵⁷ General Motors Corporation. *Annual Report to Shareholders*. Fiscal Year 2006. Page 73

¹⁵⁸ Taylor III, Alex. "Sixty to Zero: An Inside Look at the Collapse of General Motors – and the Detroit Auto Industry". Yale University Press, New Haven and London. 2010. Location 2780.

Autoworkers tended to be heavy smokers and disproportionately overweight, and G.M., which was already footing the bill to treat their diabetes, now got into the business of dispensing, free of charge, expert advice on keeping fit, living healthy and eating green vegetables.¹⁵⁹

G.M.'s health care costs reflect the skyrocketing costs of health care itself, which, in turn, is the result of deep, structural problems in American health care markets that no person or organization could have reasonably anticipated.

A 2007 report in the *New England Journal of Medicine* argues that America's health care problems are indeed related to demography, technology and personal behaviors, but Robert Kuttner takes a broader perspective on the issue, estimating that 25 cents of every dollar spent on American health care is tied to administrative costs, claims processing, profits and marketing, suggesting some tangible areas of reform apart from blaming American workers themselves.¹⁶⁰ The core set of issues, he argues, centers on markets for health care in the United States that have complex and often convoluted sets of incentives that produce what he terms "... a blend of over-treatment and under-treatment and escalating costs", in addition to demographic shifts in the American populace, technological advances and legal costs.¹⁶¹ According to the study, America reportedly spends between \$250 and \$300 billion dollars on administrative expenses alone every year. T.R. Reid, a long-term journalist for the *Washington Post* supports this point, arguing that other advanced industrialized countries save on average, 10% of their costs by standardizing the administrative aspects of health care.¹⁶²

One cannot dispute that health care and retirement costs hurt General Motors' profitability. But, it is incorrect to pin G.M.'s decline solely on the U.A.W.'s legacy costs. According to Alex Taylor III, a former industry reporter for *Forbes*, G.M.'s health care costs for current and former employees adds \$1,525 dollars onto each auto the company sells¹⁶³. Harley Shaiken cautions that wages and the burdens of pensions and health care are important when investigating G.M.'s decline, but argues there were deep, structural problems with General Motors' finances, investments, broader managerial strategies and bureaucracy that impeded the company from making needed changes.¹⁶⁴ That's a polite way of saying that G.M. made cars that fewer and fewer people wanted and designed and produced them too slowly. Moreover, GM investments rarely became profitable, the company managed too many brands and dealerships, and had a corporate culture with a decades-long habit of insulating itself from criticism and the increasingly harsh realities of a shifting market. The

¹⁵⁹ Lowenstein, Roger. *While America Aged: How Pension Debts Ruined General Motors, Stopped the NYC Subways, Bankrupted San Diego, and Loom as the Next Financial Crisis*. The Penguin Press. New York, 2008. Kindle Edition. Location 1010.

¹⁶⁰ Kuttner, Robert. "The Devil is in the Health Care Reform Details". *The American Prospect*, June 5, 2009. Prospect.org.

¹⁶¹ Kuttner, Robert "Market-based Failure – A Second Opinion on U.S. Health Care Costs". *The New England Journal of Medicine*. Issue 358. Pages 549-551. February 7th, 2008.

¹⁶² T.R. Reid. *The Healing of America: A Global Quest for Better, Cheaper and Fairer Health Care*. Penguin Books. New York. 2010. Page 3.

¹⁶³ Taylor, Alex III. *Sixty To Zero: An Inside Look At the Collapse of General Motors – And the Detroit Auto Industry*. Yale University Press. New Haven Conn. Kindle Edition, location 2781.

¹⁶⁴ Shaiken, Harley. "Motown Blues: What Next for Detroit?". *Dissent*, Volume 56, Number 2. Spring 2009.

only profitable segment of G.M.'s operations through most of the decade was their finance arm, Ally Financial, which until 2009 was known as General Motors Acceptance Corporation. GMAC's operations, originally limited to providing car buyers reasonable financing for buying G.M.'s vehicles, changed in the early 2000s as the unit became one of the largest originators of home mortgages in the world, rivaled only by the largest and apparently most unstable commercial and investment banks.

GENERAL MOTORS: DEBT AND DECLINING SALES AND THE BEGINNING OF THE END

Despite selling 8 million vehicles and recording \$169 billion dollars in revenue in 2001, G.M.'s balance sheet barely skimmed the black and earned only \$1.22 billion in profit.¹⁶⁵ Profits remained slim, inching upwards to \$1.9 billion dollars in 2002 and reaching its pre-bailout peak of \$2.8 billion dollars in net profits from \$193.5 billion dollars in sales in 2003.¹⁶⁶ Keeping those numbers in mind, during that same stretch between 2000 and 2004, General Motors' long term debt quadrupled, going from a relatively modest \$7.4 billion dollars to \$32.5 billion dollars in 2004.¹⁶⁷

One explanation of how General Motors' debt outpaced its sales is to look at the incentives it was offering on its vehicles. G.M. needed production volumes high and consistent to keep its unit prices low and to recoup its high development costs. Data from 2002 illustrates this point. General Motors' sales in North America dipped between 2002 and 2003 despite offering an average of \$3,914 dollars in incentives on each car and truck sold. Toyota, in contrast, enticed buyers with relatively meager offerings of \$2,259 dollars. Toyota, in other words, offered half the incentives G.M. did on average and recorded a small 1% increase in sales over the previous year, creating a 7% percentage point swing in Toyota's favor. Richard Wagoner, General Motors' CEO at the time, supplemented incentives with zero percent financing in 2004 and 2005 as part of his larger goal to return the company to 29% share of the North American market.¹⁶⁸ Unfortunately, G.M.'s best customers were its own employees. Wagoner deserved some credit because G.M. increased sales from 8 million units in 2004 to 8.4 million units sold globally in 2008 with the incentive structure in place.¹⁶⁹ Profits turned negative and their long-term debt [apart from pensions and health care] climbed in 2005 despite the fact G.M. sold millions of cars. A partial explanation lies in the financing and rebate incentives G.M. was offering, but there are other factors to consider.

General Motors reminded its shareholders the company grew in three out of four global markets but was less enthusiastic about having lost market share in the one market that counted above all others, the North American market. Though the company realized a small .5% uptick to 28% in North American market share in 2002, that would represent the high point for the rest of the decade. G.M.'s once unassailable perch a few decades earlier fell to

¹⁶⁵ General Motors Corporation. *Annual Report To Stockholders: 2003*. Detroit, Michigan. <http://www.gm.com/investors/>. Pg. 4.

¹⁶⁶ Ibid.

¹⁶⁷ General Motors Corporation. *Annual Report To Stockholders: 2004*. Detroit Michigan. www.gm.com/investors. Pg. 83.

¹⁶⁸ Taylor, Alex III. *Sixty To Zero: An Inside Look At the Collapse of General Motors – And the Detroit Auto Industry*. Yale University Press. New Haven Conn. Kindle Edition, location 2299.

¹⁶⁹ General Motors Corporation. *Annual Report to the SEC*. Fiscal year 2008. Form 10-k. Available from sec.gov pg 57.

23% in 2007, indicating its continued loss of market share.¹⁷⁰

Moody's downgraded G.M.'s credit and stock in 2005 to speculative and moderately risky and cited the company's negative cash flow, rising health care costs, high fixed costs, and excess capacity. The report itself warned, "[restructuring GM includes] ... repositioning G.M.'s product offerings in order to curtail the need for large sales incentives...".¹⁷¹ The automaker had more productive capacity than it required, which resulted in higher fixed costs while rising health care costs and unfunded liabilities showed no sign of slowing. Finally, G.M. needed to sell cars that people wanted without having to write down the price so drastically. Markdowns, incentives and declining market share are reflected in the automaker's long-term debt throughout the decade. At the end of the calendar year 2000, General Motors recorded a reasonable \$7.4 billion dollars in long-term debt.¹⁷² Seven years later in 2008, however, the company's long-term debt multiplied almost five times to \$33.4 billion dollars, with the largest difference coming between 2002 and 2003 when debt jumped from \$16 to \$29 billion.

G.M. tried to remain price competitive with growing long-term debt and unfunded pension and health care obligations. Moody's credited G.M. for streamlining assembly plants and increasing productivity and quality. Moreover, it commended the company for offering a more competitive product lineup. Nonetheless, Moody's downgraded G.M.'s credit because the company was still in danger given sliding market share and rising unfunded legacy obligations. Moody's stated what the market expected: keep shipping and selling more units, do not increase buyer incentives, maintain a 28% share of the North American market, reach a "reasonable" agreement with the U.A.W. and continue to close the product quality gap with Japanese automakers.¹⁷³ Reasonable or not, G.M. did not reach those markers as market share dipped in 2004 by almost an entire percentage point and long-term debt spiked to \$32.5 billion dollars.¹⁷⁴ One bit of good news coming out of 2004 was that G.M. lowered unfunded health care liabilities to \$23 billion but these liabilities were still almost three times more underfunded than pensions with the number increasing to \$28 billion dollars the very next year in 2005, making the victory temporary.^{175 176}

DECLINING TRUCK AND SUV SALES

The other oft-cited factor affecting G.M.'s bottom line is, as S.E.C. filings note a "...declining consumer preference for higher margin vehicles".¹⁷⁷ Higher margin vehicles refer to trucks, SUV's, and luxury cars, demand for which was leveling off after a decade of growth. G.M expanded capacity for these vehicles to meet projected demand that, as we all

¹⁷⁰ General Motors Corporation. *Annual Report to Shareholders: 2007*. Pg 53.

¹⁷¹ Moody's Investor Service: "Rating Action: Moody's Lowers GM's Ratings". Global Credit Research. August 24, 2005.

¹⁷² General Motors. *Annual Report to the SEC*. Fiscal year 2000. Form 10-K. Part II, Item 6. "Selected Financial Data".

¹⁷³ Moody's Investor Service. "Moody's Lowers GM-Long-term Rating to Baa1". June 13, 2003. Pg 2

¹⁷⁴ General Motors Corporation. *Annual Report to Shareholders: 2004*. Pg 83

¹⁷⁵ *Ibid.*, Page 63

¹⁷⁶ General Motors Corporation. *Annual Report to Shareholders*. 2005. Page 103

¹⁷⁷ General Motors Corporation. *Annual Report to the SEC*. Form 10-k. Fiscal Year 2006. Page 23.

Available: sec.gov

now know, fizzled as oil and gas prices began rising in the mid-2000s. As demand dipped, only then did G.M. address its production volumes and capacity; only when profits turned negative did G.M. acknowledge what analysts and industry commentators had known for some time, that G.M. was over-leveraged in trucks and SUV's and was years behind its competitors on development of a fuel efficient vehicle lineup.

Public filings for General Motors indicate that as the company inched towards bankruptcy it produced more trucks and cars than it could sell. The evidence suggests overproduction was a long-standing issue, even during profitable years. Yes, General Motors bet too heavily on sustained sales of its SUV's but it is not difficult to see why they made that mistake. G.M. earned upwards of ten thousand dollars profit on each truck and SUV while passenger cars earned literally a fraction of that amount.¹⁷⁸ G.M. reduced its capacity but sales evaporated just as fast due to rising oil prices and market saturation. It is at this point, with sales and volume falling in unison, that we see the complexities of G.M.'s financial deterioration.

G.M.'s decision not to reduce capacity between 1997 and 2004 was likely driven by several factors: first, it is entirely plausible that the company's top management did not note a pressing need to reduce production levels given their profitable truck sales were increasing. Second, as other authors have highlighted, General Motors was a massive company, with a dozen different brands, even more models and an array of disorganized suppliers and when this is combined with an outdated design process, it made lineup changes appreciably slow and expensive. Looking first at sales, in isolation from a variety of other metrics, the outlook for G.M. was optimistic in the early 2000s given trucks sales in the United States (which includes Sport Utility Vehicles) steadily increased every year between 1997 and 2004, rising from slightly more than 2 million trucks sold in 1997 to over 2.8 million sold in 2004.¹⁷⁹ The overall significance of auto sales data turns to some degree on what relation they have to two other metrics; production volume and production capacity.

¹⁷⁸ Shaiken, Harley. "Motown Blues: What Next for Detroit?". *Dissent*, Volume 56, Number 2. Spring 2009, page 2.

¹⁷⁹ General Motors Corporation. *Annual Report to the SEC*. Fiscal Year 2003. Form 10-K. "Competitive Position" page 5. Sec.gov.

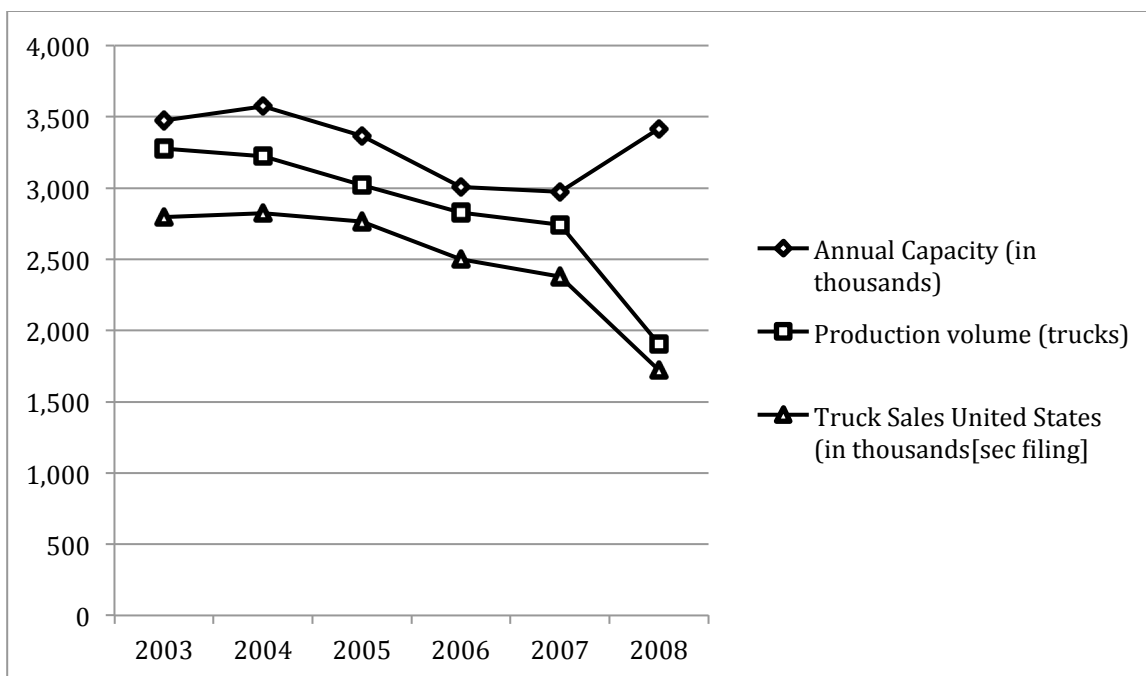


Figure 4: Source: Ward's Automotive Group

The intersection of these three metrics paints a clear but less optimistic picture of General Motors' operations.¹⁸⁰ Though G.M. truck sales remained steady, excess production volumes and capacity stifled the company's profits. A pressing concern for General Motors was the number of trucks sitting unsold and the idle capacity. Despite selling more trucks in 2004 than any of the previous seven years (2.82 million as previously noted), G.M. produced 3.2 million units for sale in the United States, leaving a balance of four hundred thousand trucks unsold.¹⁸¹ The previous year, 2003, the gap between trucks produced and trucks sold was even wider, with five hundred thousand trucks left on the lot despite selling 2.8 million trucks. In one sense, the years of 2003 and 2004 were successful but most analysts understood there were still one million unsold trucks during those two years, which strongly suggests there's a longer-term cost problem dragging on the bottom line the company had yet to sufficiently address.

It is precisely this gap between how many they're producing and how many they're selling, between volume and sales that alarmed industry and stock analysts. The steadily increasing sales of its trucks allowed G.M.'s management to continue putting off these obviously necessary reductions, though in their defense, the company did begin gradually reducing production volumes in 2004, but waited until 2005 to make any appreciable adjustments, reducing production volumes that year by two hundred thousand units to 3 million trucks (citation). But apparently their actions weren't aggressive enough because in 2006, despite trimming production by two hundred thousand units from the year before, the company still had an excess of three hundred thousand unsold trucks at the end of the year.¹⁸²

¹⁸⁰ See figure 4.

¹⁸¹ General Motors Corporation. *Annual Report to Shareholders*. Fiscal Year 2004. Page 45

¹⁸² General Motors. *Annual Report to the SEC*. Fiscal Year 2006 Form 10-k. "Item 1: Business" Pg 6.

Looking at production capacity as a third metric strengthens the previous argument that G.M.'s reduction in volume, particularly for its trucks, was a step in the right direction. Despite analysts' warnings, however, about G.M.'s profits, debt and capacity as well as internal reports echoing those concerns, G.M. waited until 2006, when oil prices were high, truck sales were in solid decline and its debt was far past the point of sustainability to address these long-standing and well-known financial difficulties, which of course ultimately proved to be too late. Going back to 2003, not only is there an appreciable gap between truck volume and sales, but also a disturbing gap exists along the third axis of production capacity in relation to sales. In 2004, G.M. sold 2.8 million trucks in the United States, had production volume of 3.2 million trucks and perhaps most tellingly had the capacity to produce over 3.5 million trucks.¹⁸³ As General Motors entered the mid-to-late 2000s this pernicious cycle of declining sales alongside excess volume and capacity worsened.¹⁸⁴

G.M. blamed the U.A.W. in 2005 arguing that union contracts prevented it from closing plants to reduce capacity.¹⁸⁵ Nonetheless, due to concessions from the U.A.W., General Motors trimmed production volume to 2.8 million, which was exactly the same number of truck sales in the United States the previous year (2005) and reduced capacity by four hundred thousand trucks. Yet, sales for the year 2005 were under the automaker's adjusted target of 2.5 million, three hundred thousand fewer than the year before.

G.M.'s excess volume and capacity is a legacy of the late 90's and early 2000s over-investment in trucks and SUV's and cannot be explained solely as a function of union contracts. The other side of the equation here is that G.M. was caught between the twin scissors of pre-existing overcapacity and a permanent sea change in consumer preferences away from their best selling and most profitable vehicles. In effect, G.M. bet large on SUV's and lost. Despite trimming production, General Motors waited until late in the game to do so. Moreover, the time and money needed to change production for 12 different brands assured that change wouldn't be swift. Compounding the problems for G.M was a pattern of scuttling or underfunding investments in alternative energy projects such as hybrids. These shortcomings coupled with a relatively inefficient system of product development meant that as oil prices rose and consumer preferences shifted, G.M. functionally had little in the hopper it could bring to market in a reasonable amount of time, unlike most of its Japanese competitors.¹⁸⁶

Going into 2008, General Motors tried to arrest its slide in North American market share and manage its spiraling health care costs. Though G.M. finally was made critical changes, at the end of 2008, the financial crisis and subsequent recession collapsed demand for their cars by 40% in a few months, essentially bringing a decades-long slide to a swift and decisive end. The idea, however, that General Motors and all its subsidiaries were the the victims of unstoppable and nameless global forces conveniently elides how General Motors and other companies had an active hand in precipitating the very crisis that not only claimed the company, but left a prolonged recession in its wake.

GMAC, LEVERAGE AND THE GREAT RECESSION

¹⁸³ Ward's Automotive. "North America – 2004 Model Changeover Dates".

¹⁸⁴ Ibid.

¹⁸⁵ Ward's Automotive. "North American – 2006 Model Changeover Dates".

¹⁸⁶ Vaitheeswaran, Vijay. *Zoom: The Race to Fuel the Car of the Future*. Twelve Publishers. 2007. Kindle Edition. Location 1534

In the run-up to the financial meltdown, G.M. quietly diverted cash into its booming mortgage business, run by the company's financial arm, General Motors Acceptance Corporation (GMAC). GMAC, now known as Ally Bank, was G.M.'s financial subsidiary primarily charged with originating reasonable car loans for G.M.'s customers. GMAC maintained a respectable portfolio of mortgage originations but between 2001 and 2008, GMAC transformed from an automotive finance company dabbling in mortgage finance into one of the ten largest mortgage originators on the planet. Within six years, G.M.'s largest subsidiary was one among a handful of massive companies that both contributed to and profited from historic rises in home prices in United States, eventually creating hundreds of billions of dollars in risky mortgages.

Most scholars and commentators that have addressed the collapse of General Motors all seem to hit the same note; that the costs of health care, pensions and poor management placed the company in precarious circumstances when global financial markets imploded in 2008. As demand for large ticket items spiraled downward and credit markets froze, G.M.'s fate was essentially sealed as the recession simply caused the bankruptcy that many observers thought inevitable anyway. Implicit within most narratives of G.M.'s collapse is that the financial meltdown, caused primarily by inflows of foreign credit, low interest rates and lax underwriting standards fueling an unprecedented inflation of mortgage-based assets, conveniently portrays General Motors as a victim, omitting its role in the crisis and the slow-recovery. Instead, G.M. was one of the largest, most important players in the mortgage industry. To use a legal analogy, G.M. was not as much a victim of the financial crisis as it was complicit in the inflation and bursting of the American housing bubble.

Public understandings of the financial meltdown and recession have evolved and the complexity and structural roots the crisis has become more evident. The precipitating event stems from the rapid and unprecedented rise in the value of American homes, though the factors driving this unprecedented appreciation remains more difficult to outline. According to the report issued by the Financial Crisis Inquiry Commission, the Federal Reserve kept short-term interest rates too low for too long and failed to exercise its proper authority over lending standards for home mortgage financing, underwriting mortgage originators' increasingly risky patterns of lending. Secondly, the Securities and Exchange Commission has been excoriated for its inattentiveness toward so-called "shadow banking", or privately negotiated derivative and financial instruments, allowing that sector of inter-institutional lending to grow unchecked and uninvestigated until the problems of toxic assets and their attendant agreements had already posed a systemic risk.

THE EVOLUTION OF GENERAL MOTORS ACCEPTANCE CORPORATION

From its relatively humble origins as a company initially charged with financing new vehicles for General Motors' customers, GMAC remade itself into a large-scale financial institution dealing primarily in mortgage originations. This fundamental shift in GMAC's business model did not begin as a small niche venture of a large company, that with a clear and deliberate progression took over large shares of the company's operations. Rather, according to their records, the growth in GMAC's mortgage origination business was so swift and decisive that at its height the volume of money annually circulating through the company rivaled that of the largest financial institutions in the world and the automotive aspect to their business became little more than an elaborate hobby. Rather than being the victim, General Motors and its associated companies flooded credit markets with hundreds of billions of

dollars in risky, mortgages and mortgage-backed assets, making it a contributor in the financial meltdown in 2008 that ironically, claimed their automotive business. In 1998, GMAC's financial activities actually resembled that of an automotive finance company that had a small niche interest in originating and holding a small but respectable base of mortgage assets, originating \$18.9 billion dollars in mortgages, increasing to \$21.5 billion and \$22.1 billion dollars in originations in 1999 and 2000.^{187 188} However, just two years later in the year 2000, GMAC financed \$118 billion dollars in mortgages (prime, alt-a, subprime and equity refinances) for American consumers, a 75% increase between 2001 and 2002 and a 500% total increase in two years. GMAC's management understood how it could profit from rising home values and in the absence of any meaningful regulatory oversight, entered the banking business and became one of the most influential competitors in the industry.

GMAC continued muscling its way into domestic credit markets in the subsequent years following 2002, financing slightly over \$179 billion dollars in mortgages in 2003; a 35% year-over-year increase of the company's previous high.¹⁸⁹ Putting that number into some perspective, the total value of GMAC's mortgage originations in 2003 was slightly more than 8 times larger than underwritings a mere three years prior. GMAC's mortgage operation in 2003 alone was greater than the 2010 GDP of Peru (\$153 billion dollars). From 2004 onwards, GMAC's originations plateaued, then stabilized for the next several years, financing \$147 billion dollars in mortgages in 2004, \$175 billion in 2005 and \$161 billion in 2006.^{190 191 192}

¹⁸⁷ General Motors Acceptance Corporation. *Annual Report to the SEC*. Form 10-K Fiscal Year 1999, Note 13: "Mortgage Banking". Page 48.

¹⁸⁸ General Motors Acceptance Corporation. *Annual Report to the SEC*. Form 10-K Fiscal Year 2000, Note 13. "Mortgage Banking".

¹⁸⁹ General Motors Acceptance Corporation. *Annual Report to the SEC*. Form 10-K. Fiscal Year 2003. "Mortgage Operations". Page 19.

¹⁹⁰ General Motors Acceptance Corporation. *Annual Report to the SEC*. Form 10-K. Fiscal Year 2004. "Mortgage Operations". Page 22.

¹⁹¹ General Motors Acceptance Corporation. *Annual Report to the SEC*. Form 10-K. Fiscal Year 2005. "Mortgage Operations" Page 36

¹⁹² General Motors Acceptance Corporation. *Annual Report to the SEC*. Form 10-K Fiscal Year 2006. "Mortgage Operations". Page 35.

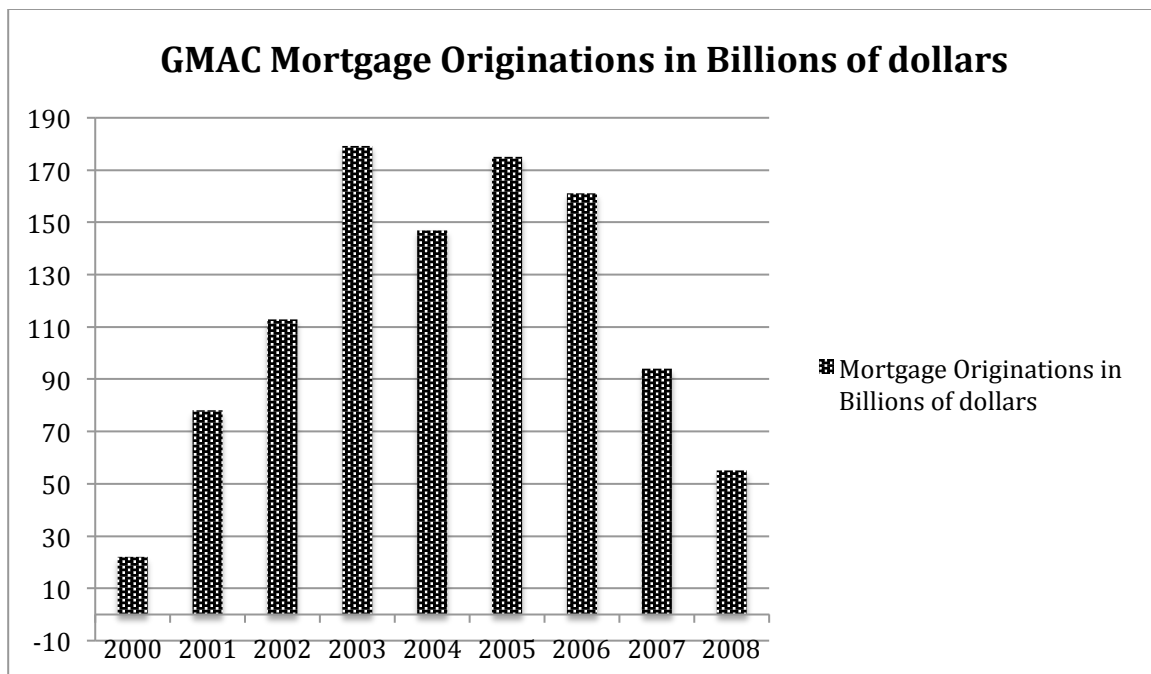


Figure 5. GMAC SEC 10K.

GMAC entered the mortgage business late but by 2006 the G.M. subsidiary was the world's eighth largest originator behind Bank of America, Washington Mutual, Chase Manhattan, Citibank, and the infamous Countrywide Financial just to name a few.¹⁹³ Taking a broad view, as the eighth largest mortgage financier, GMAC alone financed \$1.1 trillion dollars (\$1,160,000,000,000) in mortgages between 2000 and 2010.

There are several factors influencing the declining quality of the loans: most obviously, GMAC understood that the real profit was from securitizing and selling them to other parties and collecting servicing fees on these mortgages and not retaining them. GMAC used securitization to insulate their balance sheets against the possibility that the homeowners they lent to defaulted, consequently the value of the assets they created declined. Several factors obscured the risk associated with these assets as many of the agencies charged with evaluating risk caved under immense pressure to hand out top-notch "AAA" ratings on securities and assets whose quality was at best, questionable and at worse, fraudulent. Not surprisingly, GMAC pushed back against the assertion it knowingly financed risky mortgages, citing that the majority of their productions were so-called "prime" mortgages, or lower risk loans that met the allegedly more demanding standards for Fannie Mae and Freddie Mac, a designation supposedly indicating they were safe enough for pension funds to invest in.

The irony here of course being that Fannie and Freddie, once the definition of stability, were not immune from the immense, competitive pressure to lower their standards, which is exactly what happened in the mid 2000s as they were losing market share to other financial institutions. One could argue that when Fannie and Freddie started purchasing subprime mortgages, loans they considered unsuitable for long-term investment, that it was the formal acceptance of what was already market reality. While that did not necessarily

¹⁹³ Muolo, Paul. "3Q Production Drops 11%". National Mortgage News. Volume 31, Issue 11. December 4th, 2006. Page A-1.

mean these ratings were meaningless, the significance of the “prime” designation” was unavoidably diluted. While GMAC was technically correct when it stated that a slim majority of its originations were “prime” and, accepting for the sake of argument that prime mortgages were materially “safer”, that does not change the fact that underwriting standards were declining or that GMAC still financed at least half a trillion dollars in non-prime and subprime or categorically riskier mortgages in the span of only a few years.

Between 2001 and 2008 GMAC expanded its presence in the risky but profitable subprime mortgage market, increasing the number of non-prime and non-conforming originations every year, representing a growing proportion of its overall serving portfolio. GMAC makes formal distinctions in its financial statements between what it calls “non-conforming” and “subprime” loans. Conforming loans are synonymous with prime and are by definition mortgages with borrowers that have excellent credit, have robust loan to value ratios (essentially the down payment relative to the amount financed) of around 20% and had met onerous documentation requirements. In between conforming loans and the barely regulated subprime market are non-conforming mortgages or “alt-a mortgages”. Alt-A mortgages meet most, but not all of Fannie Mae and Freddie Mac’s standards, placing alt-a mortgages in-between prime and subprime mortgages in terms of quality and risk.

In 2004, the finance arm of General Motors generated \$43.4 billion dollars in what it refers to as “non-conforming” mortgages and \$27.8 billion dollars in subprime loans rounding out their portfolio with \$11.2 billion dollars in home equity refinancing, or home equity withdrawals.¹⁹⁴ The following year, 2005 was their best fiscal year financing \$55.8 billion dollars in non-conforming mortgages and an additional \$35.8 billion in subprime originations. However, if you add equity refinances, which were loans that required relatively little from borrowers in terms of documentation or income, GMAC’s total non-prime financing in 2005 jumps to \$48.9 billion dollars.¹⁹⁵ While the overall stability of so-called “prime” mortgages remains an open question, it is undeniable that the company financed \$87.9 billion dollars in mortgages that by all reasonable accounts were incredibly risky in just two years. Just placing these numbers in some context, while GMAC was the tenth largest mortgage originator during the 2000s but disaggregating the data by mortgage types reveals that GMAC was actually the third largest originator of alt-a mortgages in the United States behind only Washington Mutual and Countrywide Financial, both of whom are rather dubious company to keep.¹⁹⁶ GMAC was, in fact, the fourth largest interest-only lender in the nation in 2006.¹⁹⁷

After the Treasury department lent General Motors and GMAC a combined \$19.4 billion dollars by the end of 2008, they went to additional and extraordinary lengths to secure the solvency of General Motors and its subsidiaries. GMAC’s relatively thin base of assets relative to their outstanding debt that the Treasury initiated two additional rounds of emergency financing through 2009 using the Troubled Asset Relief Program. As illustrated in figure 6, GMAC received \$7.5 billion dollars in May 2009, which was in addition to the original \$6 billion dollars the company received in December 2008, pushing the total

¹⁹⁴ General Motors Acceptance Corporation. *Annual Report to the SEC*. Fiscal Year 2005. Form 10-K. “Mortgage Operations”. Page 22.

¹⁹⁵ *Ibid.*, Page 36.

¹⁹⁶ Isidore, Chris. “‘Liar Mortgages’. Mortgage Woes beyond subprime”. CNNmoney.com. March 17, 2007.

¹⁹⁷ Author Unknown. “I.O. Volumes Fall by 25%”. *National Mortgage News*. Volume 31, number 12. December 11, 2006. Page 1.

assistance for GMAC to \$13.5 billion dollars.¹⁹⁸ As of mid 2009, General Motors and its subsidiaries received a total of \$26.9 billion dollars in aid from the Federal government. As it turns out, these funds were only the beginning of their efforts to keep G.M. solvent. In December 2009, the United States Treasury announced a newer, more comprehensive plan to further assist the flailing finance company, including requiring splitting GMAC away from General Motors and re-classifying the new company as a traditional commercial holding bank, then issuing an additional \$3.8 billion dollars in funding, pushing the total amount of Federal Support to General Motors to \$30.7 billion dollars by the close of 2009. One of the significant conditions of this new round of financing was that “Ally Financial” as the new bank was called, would be owned 56% by the Treasury department, who would have the authority to appoint two members to the board.¹⁹⁹

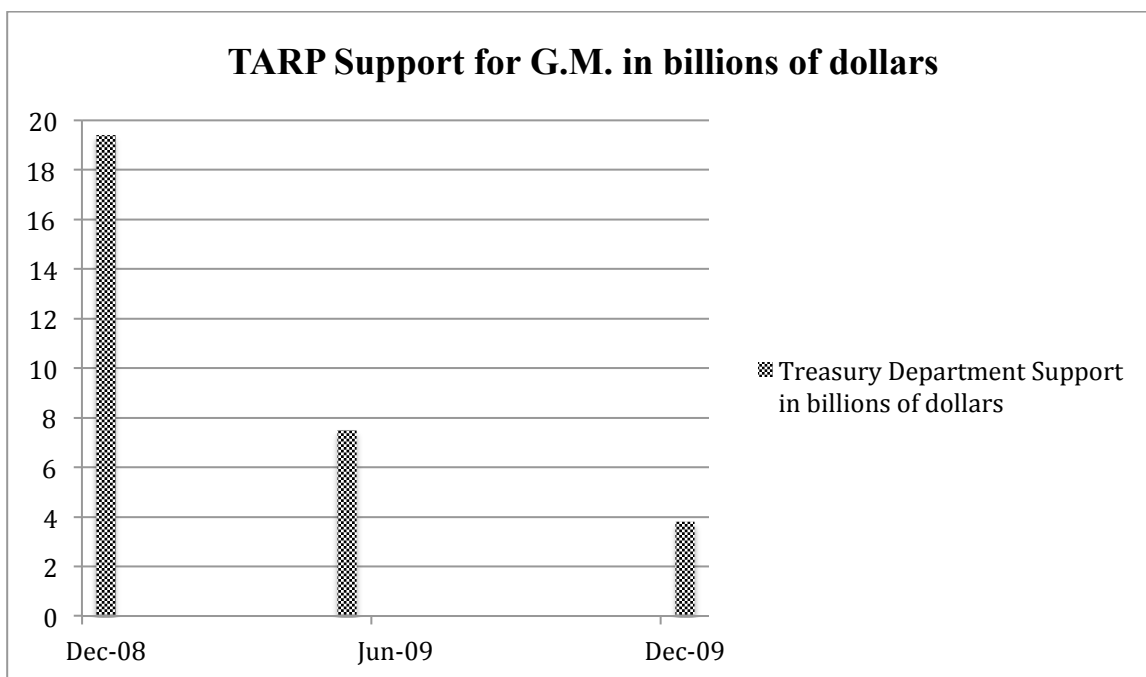


Figure 6: Treasury Department Aid to General Motors

GOVERNMENT SPONSORED ENTERPRISES, GENERAL MOTORS AND THE SECONDARY BAILOUTS

After the Treasury department infused G.M. and its subsidiaries with cash, a less immediately visible tool was being used to maintain solvency within the financial sector. Data from GMAC’s annual filings with the Securities and Exchange Commission suggest the relationship between GMAC and various Government Sponsored Enterprises (GSE’s hereafter) was intimate and determinative. Through most of the 2000s, Federal GSE’s were a disproportionately important customer of GMAC. In 2005, the Federal Government (via its

¹⁹⁸ Yousuf, Hibah. “GMAC receives 3rd Round of bailout funds”. CNN Money, December 30th, 2009.

¹⁹⁹ Ibid.

GSE's) purchased 30% of GMAC's mortgage originations, totally \$50.6 billion dollars.²⁰⁰ Like clockwork, Federal GSE's purchased \$45.9 billion dollars worth of mortgage-backed assets from GMAC in 2006 and \$49.1 billion dollars in 2006 and 2007 and increased its share of GMAC's output to 42% in 2007.²⁰¹

In 2008, GMAC retained one large and important customer in the Federal Government. Despite cutting its total originations in half, Federal GSE's (Fannie Mae and Ginnie Mae) purchased \$49.8 billion dollars in mortgage assets in 2008, representing an alarming 87% of GMAC's total originations for that entire year.²⁰² The U.S. government had become GMAC's sole benefactor. This relationship continued into 2009 and with global credit markets frozen GMAC still sold \$54.8 billion dollars in mortgage backed assets to GSE's totaling 91% of their total originations for that year. In total the Federal government purchased more than \$100 billion dollars in mortgage related assets between 2008 and 2009.²⁰³ In practice, the Federal Government used Fannie and Freddie to buy up these excess mortgages, indirectly pumping liquidity into the financial industry, GMAC in particular. It should be noted, however, that the United States Treasury placed Fannie and Freddie (and other GSE's) into receivership in late 2008, allowing GSE's to access \$100 billion dollars in short-term funds each from the Federal Reserve and shoring up Federal guarantees of their portfolios.

It turns out that, contrary to the paragons of stability they were once thought to be, Fannie Mae and Freddie Mac were responsible for \$5.3 trillion dollars in mortgage assets based on only \$70 billion dollars in assets at the height of the crisis, meaning the companies were leveraged 75:1.²⁰⁴ The Federal Reserve and the Treasury department were using Fannie, Freddie, Ginnie and other GSE's as liquidity backstops for financial markets, using them to purchase hundreds of billions of dollars in mortgage related securities in 2008 and 2009. From a financial perspective, the Federal Reserve and the Treasury department used GSE's as customers of last resort and mainlined liquidity into these companies. Using Fannie and Freddie to soak up risky assets then bailing both companies out in separately allowed the Bush and Obama administrations to cluster multiple smaller financial bailouts into one massive rescue package, allowing companies like General Motors and its subsidiaries to double-dip in Federal assistance.

²⁰⁰ General Motors Acceptance Corporation. *Annual Report to the SEC*. Fiscal Year 2006. Form 10-K. "Mortgage Operations". Page 36

²⁰¹ General Motors Acceptance Corporation. *Annual Report to the SEC*. Fiscal Year 2008. Form 10-K. "Mortgage Operations". Page 312

²⁰² General Motors Acceptance Corporation. *Annual Report to the SEC*. Fiscal Year 2009. Form 10-K. Page 56.

²⁰³ *Ibid.*, page 4.

²⁰⁴ Financial Crisis Inquiry Commission. "Final Report on the Causes of the Financial and Economic Crisis in the United States". January 2011. "Deregulation Redux". Page 93.

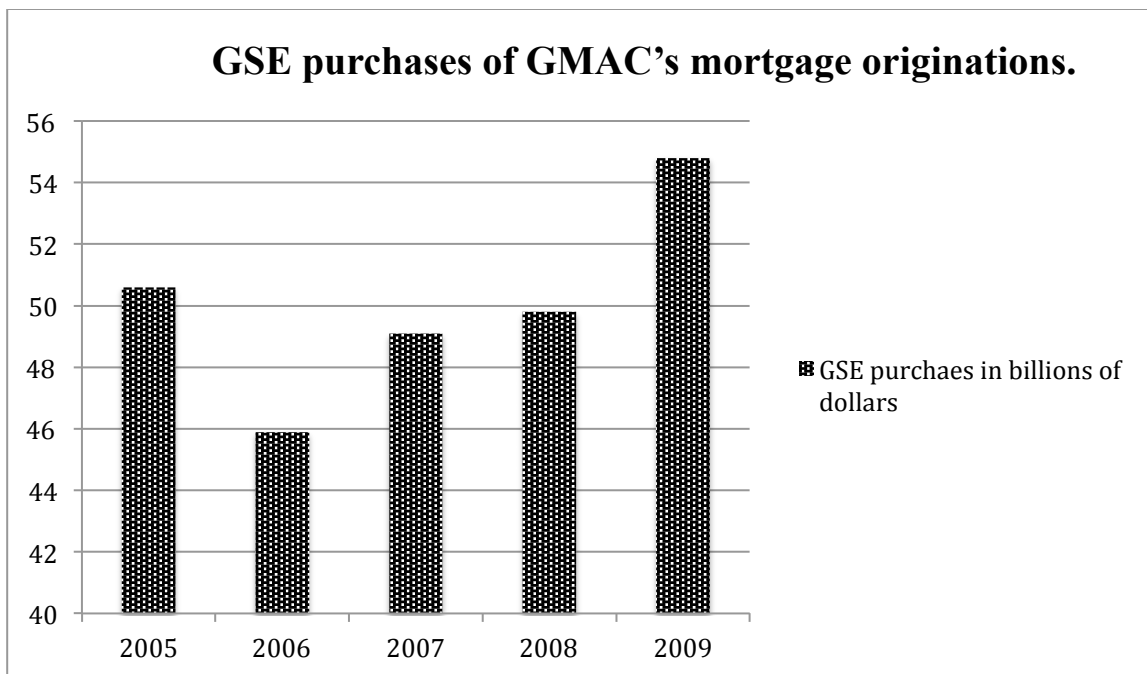


Figure 7: Source GMAC SEC 10K

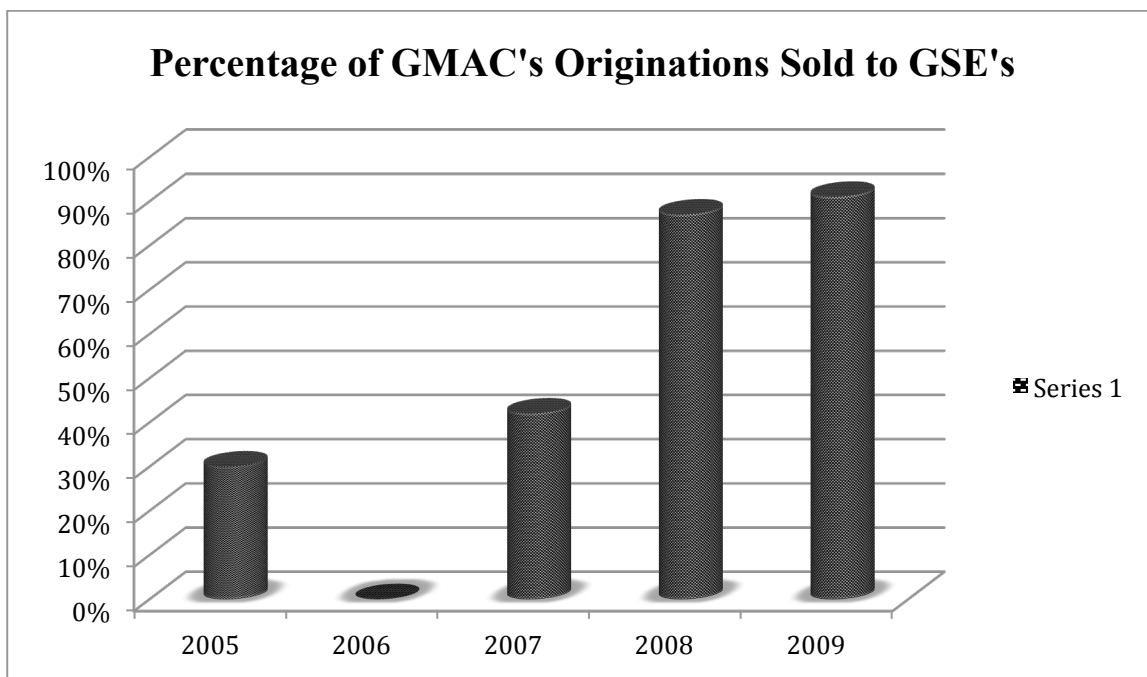


Figure 8: Source GMAC SEC filings

General Motors filed for chapter 11-bankruptcy protection, after which it sold off most of its brands and re-organized its long-term debt. In March 2009, however, the Obama administration orchestrated a more detailed bailout and re-organization plan for the corporation. In effect, General Motors received three bailouts: one for General Motors proper

in 2008. As a subsidiary, GMAC received separate bailouts in 2008, 2009 and sold a hundred billion dollars in mortgage securities to Government Sponsored Enterprises in the middle of the financial crisis.

GMAC, in particular, left a legacy that dampened economic recovery in the United States for some time. As foreclosures rose through 2009, the value of mortgage-backed assets declined and in the wake of Lehman Brothers' and Bear Sterns' failures, the global economy entered a period of extended credit rationing where lenders froze access to liquidity for all but the choicest customers, crimped the supply side and deepened the recession. Because home values were (and continue to be) out of alignment with incomes large portions of these bundles of mortgage-backed assets went into default and shook the foundation of the larger structured asset. There are two consequences of this: first, if home values continue to decline and foreclosures continue to rise, trillions of dollars in mortgage-backed assets lose their value, placing banks' balance sheets at risk. It follows that the scale of declining asset prices devastated the balance sheets of hedge funds and major financial institutions, making it necessary for the Federal Government to step in to help repair their balance sheets with short-term lending to keep liquidity available. Well into 2011, however, American financial markets are still rationing credit, despite the enormous and unprecedented policy efforts of the Federal Reserve and the Bush and Obama administrations to stimulate lending.

ASSET DEFLATION: WHAT'S THE LONG-TERM LEGACY OF GMAC FOR THE AMERICAN ECONOMY?

Where did GMAC find the money to finance a trillion dollar mortgage operation? The answer is simple; they borrowed it. As a non-commercial financial institution, GMAC was not limited by the rules governing commercial banks. Unlike a traditional commercial bank, GMAC was not bound by the strict reserve and hedging requirements of the Federal Reserve. GMAC borrowed against its liquid and securitized assets like any other lender would, but because they weren't bound by specific reserve requirements, over time GMAC's leverage reached outrageous proportions. According to *Inside Mortgage News*, GMAC was leveraged 23:1 debt to assets, meaning that for every dollar they held in assets and reserves, they owed twenty-three dollars in debt. Just to place that ratio into perspective for a moment, that's the equivalent of lending a person making \$50,000 dollars a year over \$1.15 million dollars in credit.

GMAC was only the first holder in a complicated chain of ownership for these mortgage-backed assets, with each subsequent holder using it as a base to generate larger assets that are sold to another company. Evidence suggests that the amount of leverage or debt to assets worsened with every stage in the process as originators create these mortgages, pooling according to an array of stakes in various portions of the interest and principle of the debt then selling these bundles of assets to other financial companies, who either re-sell them, or lend them out in overnight derivatives markets (known as OTC derivative) or use them as asset bases to generate more loans. At every stage, risk is either transferred; insured against with credit default swaps or covered by overnight loans, which were being continually renewed.

As foreclosures rose through 2009, the value of mortgage-backed assets declined and in the wake of Lehman Brothers' and Bear Sterns' failures, lenders froze access to liquidity for all but the choicest customers, crimping the supply side and deepening the recession,

particularly in the United States. The logical presumption was that the scale of declining asset prices devastated the balance sheets of hedge funds and major financial institutions, making it necessary for the Federal Government to step in to help repair their balance sheets with short-term lending to keep liquidity available. Well into 2011, however, American financial markets are still rationing credit, despite the enormous and unprecedented policy efforts of the Federal Reserve and the Bush and Obama administrations to stimulate lending.

Prior to his appointment as the Chairman of the Federal Reserve, Ben Bernanke was and continues to be one of the world's foremost economic thinkers whose well-deserved reputation stems from a 1983 article where he re-interprets why the 1929 collapse persisted as long as it did, turning into a depression. Crucial to Bernanke's analysis is how damaged balance sheets and extreme risk aversion froze credit markets for several years and in concert with the deflationary requirements of the gold standard turned the deep financial collapse of 1929 into a destructive and prolonged depression. Although Bernanke's argument here does not graft directly onto the current downturn, it does provide critical, if sobering insight into the extent to which the road to global recovery will be both long and tedious.

Journalists and scholars have noted how rising foreclosures put the balance sheets of banks at risk, however Bernanke's work highlights how balance sheet considerations and access to liquidity play a less significant role in credit rationing than one might assume. That's not to imply that foreclosures and declining asset prices are not a concern, because as I'll demonstrate, they clearly are. Bernanke's point, however, is that uncertainties more so than immediate financial conditions can restrain a recovery via risk averse credit markets. Current market conditions are quite complicated but there's enough data showing the relative health of the big banks, especially after the TARP programs and the Federal Reserve's \$2 trillion dollar "quantitative easing" efforts, but the risks in financial markets keeping banks reluctant to lend are not amorphous and general, they're real and remain very large.

Looking at the first stage in this argument, the trillions of dollars in risky mortgages created by GMAC and others were the seed money for assets that were larger, more complex and more heavily leveraged than the original asset. The foundation of these enormous assets of course becomes unstable and questionable the more foreclosures rise. According to Realtytrac, an industry database, in 2008, 3.2 million homes were foreclosed upon, an increase of over 30% from 2007 when 2.2 million homes were foreclosed.²⁰⁵ The data from 2010 not only shows an appreciable decline in foreclosures, but the number of foreclosures still remained very close to 3 million going into 2011.²⁰⁶ Now, although these are both record levels of foreclosures for this country, these numbers encompass only a small portion of the problem. In mid-2010, Barclay's estimated 4.5 million homeowners were 90 days or more late on their payments, which is the last administrative stage before the formal foreclosure. This statistic does not include those who are struggling but continue to make payments on their mortgages. In addition, these figures do not include homeowners who have lost all equity in their homes and are paying mortgages that are valued at more than the homes themselves. In 2008 alone, estimates on the loss of equity in American homes hovered around \$3.4 trillion while the stock market shed over \$6 trillion dollars in assets over the same period.

²⁰⁵ Realtytrac Staff. "Foreclosure Activity Increases 81% in 2008". Realtytrac.com. January 15, 2009.

²⁰⁶ Realtytrac Staff. "Record 2.9 million U.S. Properties Receive Foreclosure Filings in 2010 despite 30 month low in December". Realtytrac.com. January 12th, 2011.

Though it is not a perfect gauge of credit availability, the Federal Reserve's Quarterly Survey of Banking Officials focuses on the prevailing sentiments and lending patterns among major financial institutions. Reviewing these quarterly records since 2007 highlights some fascinating and admittedly unexpected insights into how and why credit was constrained during the recession. The most striking trend in the data is the view among lenders that it is risk aversion that was crimping credit markets and not damaged balance sheets or liquidity problems. American credit markets were locked at the end of 2008, as 95% of major lenders contracted credit to all firms, small or big, well capitalized or not.²⁰⁷ Not only did lenders finance very few new loans but those that were created were smaller, required more collateral and had shorter maturities. It was apparent through the last two quarters of 2008 that bank lending was increasingly reflecting the high levels of market uncertainty as between 60% and 70% of banks cited macroeconomic uncertainty as an important factor.

According to the survey data, though the recession was deep at the end of 2008 as between 60% and 70% of banks reported that demand for C&I (commercial and investment loans) was not high, but was still more than banks were willing to extend. Data from these surveys also show that the majority of institutions that were tightening credit were not doing so because of damaged balance sheets or out necessity. From the second half of 2008 through 2009 a steady 75% of banks reported that neither deteriorating current accounts nor unavailable liquidity were significant factors driving banks to ration their credit.²⁰⁸ Credit standards tightened, interest rate spreads widened and through 2009, despite a slight dip in loan demand, the primary driver of tight credit was uncertainty and not conditions within the industry itself.

The 2010 surveys maintain a similar theme of uncertainty and weaker demand for loans, but credit conditions did ease for the larger, well-capitalized banks. Despite the sense that some of the major banks were easing credit, the prevailing sentiment remained that uncertainty remains high and that financial firms remain risk averse.

Data from the Saint Louis Federal Reserve correlates with the conclusion of the Federal Reserve's survey of Business Lending. After doubling between 2004 and 2008, commercial and industrial lending plummeted by 30% between mid-2009 and dropped from a total of \$1.6 trillion dollars to \$1.2 trillion dollars.²⁰⁹ This pattern of stagnate lending does not correspond to some of the measures of banking assets and equity over the same time period. According to annual data compiled by the Federal Deposit Insurance Corporation, the assets of commercial banks in the United States did not vary nearly as much as lending patterns did. Between 2008 and 2009, total commercial banking assets declined from \$12.3 trillion dollars to \$11.8 trillion, a 5% decline. Also of note, the 2009 figure of \$11.8 trillion is still several hundred billion dollars higher than the figures from 2007, where Federally insured commercial banks recorded \$11.2 trillion in total assets.²¹⁰

Although banking assets and balance sheets for the moment appear sound, that does not mean systemic risks do not remain. For instance, according to recent estimates from the

²⁰⁷ Federal Reserve Board. "The October 2008 Senior Loan Official Opinion Survey". November, 2008.

²⁰⁸ Federal Reserve Board. "The October 2009 Senior Loan Official Opinion Survey". November, 2009.

²⁰⁹ Federal Reserve Bank of ST. Louis. "Commercial and Industrial Loans at all Commercial Banks". Release date January 2011

²¹⁰ Federal Deposit and Insurance Corporation FDIC.gov

Bank of International Settlements, the notional amount of outstanding OTC (private, company to company agreements) derivatives was over \$582 trillion dollars in June 2010²¹¹. These derivative contracts between two private institutions (as opposed to being publically traded) are designed to be mutually beneficial arrangements allowing firms to protect against potential financial losses on the underlying assets, in this case mortgages. OTC Derivatives are at bottom, service agreements between two companies wherein the holder of a particular asset pays another company regular fees to cover any losses in the case where the value of their given asset declines. The company holding the assets is hedging against any downward fluctuations in the asset's value while the firm making the guarantee is essentially wagering that the value of the assets in question will remain either steady or increase. The amount a company charges to provide this hedging protection will of course depend on the value and risk associated with the assets in question.

The figure of \$582 trillion dollars does not reflect the degree to which banks and hedge funds are exposed to derivative risk. According to the Bank of International Settlements, the vast majority of the outstanding derivatives are interest rates swaps, which are relatively common and do not pose quite the systemic risk that mortgage based assets and their attendant credit default swap agreements do. Within that mammoth figure remain outstanding credit default swaps (CDS) with a notational value of \$30 trillion dollars, many of which are agreements involving mortgage-backed assets. \$30 trillion dollars in notional value CDS does not represent the amount of money firms are directly responsible for, rather that's the value of the assets upon which these servicing and hedging agreements are based. Put slightly differently, \$30 trillion is the value of the assets in question, upon which the fees or coupons exchanged between the two companies are based, the larger the asset in question, the more money it will take to hedge it.

Although the percentage of money potentially owed is smaller than \$30 trillion, it is plausible that banks are responsible for several trillion dollars in payments if mortgage values continue to decline. Because these assets involve such enormous sums of money, even a drop in value as small as a few basis points has the potential to generate billions of dollars in losses for both parties. This \$30 trillion hammer will continue to hang over credit markets for some time and will keep credit markets tight, making the American recovery slow and arduous. There is no easy solution here: if home prices and consumer debt decline to reasonable levels, it will trigger enormous losses via the global derivatives market. Alternatively, given how inflated home prices already are, its unlikely existing mortgage-backed assets will appreciate quickly if at all. Furthermore, there appears to be little appetite in Congress for another expensive demand-side stimulus. Finally, middle class Americans are making less money now than they were in 1970 and have three times the debt, making the notion of the average American consumer either spending more or savings more equally unlikely.

Given the evidence, General Motors' bankruptcy was not caused by unions or worker wages or the fact that the automaker operated high costs plants like NUMMI. It was caused by reckless overinvestment in the wrong product lines, sluggish and expensive redesigns, savvy competition, declining consumer demand, rising health care costs and a global recession they helped cause.

²¹¹ Bank of International Settlements. "Amounts Outstanding of Over-The-Counter Derivatives". Can be accessed at: <http://www.bis.org/statistics/otcder/dt1920a.pdf>

AFTERWORD
THE SURPRISE TWIST AT THE END: NUMMI, THE GLOBAL MANUFACTURING SYSTEM
AND CHINA

Since the macroeconomic disruptions of 2008 and 2009, massive bailouts and equally unprecedented bankruptcies and restructurings, the North American auto industry is showing positive signs of growth. In particular, the sales of light vehicles in the United States have been trending upwards from a low of 10.4 million sales in 2009 to 11.6 million in 2010 and 12.8 million in 2011.²¹² Figures from early 2012 also appear promising with sales on pace for 14.7 million vehicles through the first quarter of this year, causing most automakers to revise their previous sales forecasts upwards. General Motors in particular has shown important signs of recovery. After emerging from bankruptcy 61% owned by the United States Treasury, the Obama administration bolstered domestic demand in the auto industry with what was officially termed the “Car Allowance Rebate System”. More popularly known as the “Cash for Clunkers”, the program was a \$3 billion dollar Federal incentive for American consumers to trade in aging, fuel guzzlers for newer, more environmentally friendly vehicles. The Federal government’s effort kept G.M. afloat and bolstered consumer confidence in the “New G.M.”.²¹³ Despite posting losses of almost \$3.8 billion dollars between July 10th, 2009 and the end of that year, General Motors managed to record a \$2.8 billion dollar profit in the first six months of 2010 after its bankruptcy restructuring while repaying \$8.1 billion dollars in loans it owed to the United States Treasury.²¹⁴

Though indicators point towards both a recovering U.S. automarket and a resurrected General Motors, the industry is far more global. Although the year 2009 was dismal for G.M., 72% of its sales that year originated outside the U.S. market, with 38.7% coming from Brazil, Russia, India and China.²¹⁵ While the other BRIC economies are playing important roles in G.M.’s recovery, not all are equally important. According to G.M.’s Initial Public Offering filing with the S.E.C., 54% of General Motors International Operation’s total sales were linked to the Chinese automotive market where the automaker has gained a 13.3% share of the market.²¹⁶ Throughout this proposal it is obvious how important China has become to G.M.’s future plans. Overall, the SEC filing projects market growth in BRIC markets to average 8.4% between 2009 and 2015. China plays a particularly important role as the report notes:

We believe China is going to be among the most important emerging markets in terms of growth potential. IHS Global Insight estimates that total annual vehicle sales in

²¹² Woodall, Bernie. “Ford Raises Forecast for 2012 total U.S. auto sales”. Chicago Tribune, April 4th, 2012.

²¹³ Rattner, Steven. *Overhaul: An Insider’s Account of the Obama Administration’s Emergency Rescue of the Auto Industry*. Houghton Mifflin Harcourt Publishers. Boston, New York. 2010. Kindle Edition, Chapter 13 location 5135.

²¹⁴ General Motors Company. *Securities and Exchange Commission Filing: Preliminary Prospectus*. Form S-1. Fiscal Year 2010. August 18th, 2010. Page 11.

²¹⁵ Ibid., page 1.

²¹⁶ Ibid.

China will increase by 8.1 million units to a projected total of 22.1 million units in 2015.²¹⁷

In June 2010, BMW, in partnership with Brilliance Auto Group, announced the completion of a brand new manufacturing plant located in Liaoning province, China. The \$750 billion plant is slated to come online in late 2011 and will be producing the BMW 5-Series luxury performance sedan. The BMW 5 series is a sports sedan built with some of the most sophisticated components available and comes with a price tag of around fifty thousand dollars. Audi, Hyundai, General Motors and Mercedes Benz are making similar moves throughout China. The ability to manufacture sophisticated vehicles, as opposed to simply assembling the car from imported components, is a leading index of how fast China's advanced manufacturing capabilities are developing. As a broad indicator of this trend, the total number of cars being produced in China has increased 350% in six years, rising from 4 million units in 2003 to well over 14 million units the year ending 2009.²¹⁸ China has already surpassed the United States as the largest automotive market in the world, selling close to seventeen million vehicles in 2010 compared to roughly eleven million in the U.S.²¹⁹

In addition, though the total number of automotive exports from China remains relatively small, analysts have noted a 75% increase in automotive exports in the first seven months of 2010 compared to the same time period in 2009.²²⁰ Moreover, the level of quality appears to be rising quickly as well. For example, according to J.D. Power and Associates Annual Initial Quality report, there was a 14% year over year increase in Chinese vehicle quality between 2008 and 2009, going from 207 defects per 100 vehicles in 2008 down to 178 defects per 100 in 2009.²²¹ Perhaps the most telling aspect of the report is how the gap in quality between Chinese manufacturers and their global competitors narrowed by 240 percentage points in the years between 2000 and 2009, indicating a steady progression in product quality over the last decade.

BMW's facility in Shenyang province appears to have been primarily an assembly facility when it came online in the mid 2000s, importing most of the necessary parts from BMW's European facilities in what the automaker referred to "parts kits".²²² Despite assembling much of these vehicles from pre-fabricated parts the Chinese government requires the plants operating in the country to meet specific local content requirements, requiring that 40% of the vehicles' content come from local sources. In May 2011, BMW announced plans to invest an additional \$800 million dollars to expand the plant's capacity as well as increasing the percentage of local Chinese manufacturing content contained in each vehicle,

²¹⁷ General Motors Company. *Securities and Exchange Commission Filing: Preliminary Prospectus*. Form S-1. Fiscal Year 2010. August 18th, 2010. Page 39.

²¹⁸ Wards Automotive Group. "Economic Summary- China". 2010

²¹⁹ J.D. Power and Associates. "China Automotive Monthly: Executive Summary". October, 11, 2011.

²²⁰ Xing, Lei. "China's Auto Exports Continue to rebound as market surpasses 10 million mark". *China Automotive Review*. 8/10/2010.

²²¹ J.D. Power and Associates "Asia Pacific Reports: Overall New-Vehicle Initial Quality in China improves Substantially, with Quality Gap Narrowing Between Chinese Domestic and International brands". October 30th, 2009. Can be accessed at: <http://content4.businesscenter.jdpower.com>

²²² BMW Brilliance Automotive Ltd. "Plant Shenyang: BMW Group: The Fascination of Production: Worldwide Production Network. Agile. Efficient. Innovative". BMW Group Publications. June 2004.

though the automaker remains mum on the exact number. While it remains unclear exactly how much locally manufactured content the expanded Shenyang facility will use going forward, it is nonetheless suggestive of a growing sophistication of the skill base of workers in China and more broadly expanding industrial capabilities that are gradually pulling advanced manufacturing in China into a more direct competitive to the United States.

While most commentators have long predicted the maturation of China's automotive sectors, the speed at which it has occurred has been remarkable. In September 2009, General Motors announced a new joint venture with China-based First Automotive Works (FAW hereafter) and opened a plant to manufacture light duty commercial trucks and vehicles.²²³ This relatively new facility was designed to use the G.M.'s "global manufacturing system", a system derived in large part from the technical layout of NUMMI. The lean manufacturing system once integral to G.M.'s efforts to revive lagging competitiveness in the U.S. has become a production beachhead in the largest automotive market in the world. Like BMW, General Motors remains subject to China's local content requirements for manufacturing and also like BMW, the quality of G.M.'s production appears to be improving as well. For example, in 2005 General Motors quietly sourced the 3.4-liter V6 engine for its Equinox Sport Utility Vehicle from one of its facilities just outside Shanghai.²²⁴ As the most technologically sophisticated component of a vehicle, successfully manufacturing a powertrain for the North American market is an impressive feat, as the ability to manufacture an engine, with thousands of moving parts and with some tolerances measured in nanometers (1 billionth of a meter) and being able to reproduce that process thousands of times is a key indicator of the rising technical capabilities of Chinese labor markets.

China, as an emerging competitor, does not figure into America's current debates over manufacturing and globalization to the extent that perhaps it should. Granted, autoworkers in the United States have dealt with bankruptcies, bailouts, retirement givebacks, declining wages and worsening work conditions since 2007, making the specter of Chinese competition important but less of an immediate concern. At the same time there's an anxiety among some in the labor community that the growing market for automobiles and auto production in China signals the impending and inevitable end of American high tech manufacturing, that American industries no matter how efficient, cannot compete with China's competitive cost advantage. Yes, China's automotive industry is coming online faster than most predicted, but that does not necessarily mean that the North American auto industry will disappear. The rapid maturation of China's high tech manufacturing base is the most fascinating phenomenon in the global economy today. The emerging influence of Chinese manufacturing capabilities is occurring as debates in the United States intensify over wages and benefits in American manufacturing, with some commentators insisting the industry must drastically reduce both to remain competitive.²²⁵ Other scholars have marshaled evidence to the contrary, arguing while positions critical of unions and high wages are widespread, they actually run counter to

²²³ General Motors. "FAW-GM Shows New Kuncheng Pickup at Auto Shanghai 2011". [Press Release] September 9th, 2009.

²²⁴ Austen, Ian. "A Chevy with an Engine from China". New York Times. March 26th, 2008.

²²⁵ Roger Lowenstein, *While America Aged: How Pension Debts Ruined General Motors, Stopped the Nyc Subways, Bankrupted San Diego, and Loom as the Next Financial Crisis*, Kindle ed. (New York: The Penguin Press, 2008).

empirical and theoretical evidence suggesting that slashing the wages and benefits of workers diminishes what are actually sources of efficiency and productivity.²²⁶

China's automotive sectors likely will play an increasingly influential role globally. This could have several implications in the coming years. First, American manufacturing and its middle class employees will be competing more directly with China in this critical industry. Second, if labor markets for high skilled work remain heavily distorted, it will be difficult for a Chinese consumer market to develop.

China's developmental emphasis on sizeable trade surpluses with other economies as well as tight state controls over foreign currency, lending and labor markets that has fueled the country's growth, is showing signs of strain. In June 2010, 1,700 workers at a Honda parts manufacturer in Zhangshan province walked off the job in protest for higher wages and greater input into their union representation, while almost a thousand miles to the North outside Shanghai, 2000 other workers walked off the job at a Taiwanese owned electronics firm.²²⁷ Alexandra Harney, author and former correspondent for the Financial Times captured the core set of issues facing the Chinese economy when she wrote,

The forces that will shape China's manufacturing sector in coming decades are already clear: rising wages and material costs, greater demand for unionization, a higher risk of litigation, a dwindling supply of cheap workers, call for better product quality and safety and downward pressure on margins.²²⁸

Harney's sentiment here has been echoed more recently by Richard N. Haas, President of the Council on Foreign Relations. He identifies several areas of pressing concern in China like inflation, a growing bubble in many of China's housing markets, declining export revenue, aging demographics and environmental degradation as posing significant, but not insurmountable, challenges to the political and economic terrain in China and East Asia.²²⁹

LEGACY

It is difficult to understate the significance of NUMMI for both General Motors and the U.A.W., as both parties had a lot at stake, both politically and economically in the long-term success of this facility. General Motors needed to show the American auto market that it was capable of changing its production model and manufacturing a vehicle that could match the quality and price of its Japanese and European competitors. The U.A.W., on the other hand, needed to show that it too could adapt to changing times and re-assert its relevance and crucial role in achieving the levels of quality and productivity the competition demanded; that the union was an asset and a source of competitive strength for the company and the American economy rather than being a liability. The success of this venture demonstrated

²²⁶ Robert Lee Scott, "The Importance of Manufacturing: Key to Recovery in the States and the Nation," in *Economic Policy Institute Briefing Paper*. Economic Policy Institute, 2008.

²²⁷ Richburg, Keith. "In China, unrest spreads as more workers rally". Washington Post, June 10th, 2011.

²²⁸ Harney, Alexandra. "The China Price: The True Cost of the Chinese Competitive Advantage". The Penguin Press, New York. 2008. Kindle Edition. Location 4554

²²⁹ Haas, Richard N. "China's Greatest Threat is Internal". Council on Foreign Relations. December 28th, 2011. www.cfr.org

how a unionized workforce and cooperative labor relations could link high wages and job security with world-class quality and efficiency.

The issue of diffusion or to what extent both General Motors and the U.A.W. took advantage of the insights from NUMMI is another question entirely. As we now understand, despite NUMMI's successes and despite the fact that key persons within General Motors may have recognized these insights, the fact remains that these methods weren't applied in other facilities till many years later. As I outlined in chapter 3, both G.M. and the union share responsibility for not adapting or applying these lessons at other U.S. facilities in a timely and consistent manner. Of course that's not to minimize the difficulty of achieving these aims in terms of the scale, expense and requisite cooperation between the union and G.M. at local and national levels.

Despite the missteps both parties may have taken in the application of NUMMI's lessons, the plant was a mirror that reflected our competitive strengths as an economy, not the least of which is organized labor. However, legislators in several states have moved to curtail the collective bargaining rights of public sector unions, citing the need to roll back pension benefits to balance state budgets and with other states giving serious consideration to the issue. In addition, the American public appears to be quite split on the role of organized labor, with some measurements of rates of support at all time lows.²³⁰

As I detailed in chapter 4, to use an automotive analogy, the American economy remains stuck in first gear, moving forward but with a slow grind. The United States Treasury department and the Federal Reserve have spent trillions of dollars in unprecedented efforts to contain the financial crisis with President Obama's "stimulus" package, former President Bush's TARP program and various rounds of "quantitative easing", (an unprecedented policy move from the Federal Reserve to purchase Treasury securities to keep long-term interest rates low thus re-capitalizing credit markets) all working to keep global financial markets solvent. Programs such as these helped arrest the slide in home values that started in 2007 and 2008, however as Robert Schiller's analysis shows, the value of American mortgages and their related assets remain dramatically above [?] their historical averages. But, banks and financial institutions are unable or unwilling to write down the value of their assets to anything resembling their current market value without incurring trillions of dollars in derivative-related losses. It is in part the vague chains of ownership associated with these assets and the possibility of trillions of dollars in losses that are holding global capital markets hostage to uncertainty.

The picture emerging from my research raises difficult issues. American workers are earning less now than they were in 1970 despite being 50% more productive.²³¹ American consumers hold well over ten trillion dollars in consumer debt, the majority of which is tied to their mortgages. I took pains in my analysis to demonstrate the importance of organized labor to the competitive future of middle class work here in the United States. Dr. Barry Hirsch at Georgia State University and Dr. David Macpherson at Trinity University, compiled an impressive data set on American union density that shows in part, an alarming decline in the percentage of private sector American workers currently in a union, dropping from 11.9% in 1990 down to 6.9% in 2010 (see figure 5).²³² This long-run decline in American union

²³⁰ Surowiecki, James. "State of the Unions". *The New Yorker*. January 17th, 2011.

²³¹ Freeman, Richard B. *America Works: The Exceptional U.S. Labor Market*. Russell Sage Foundation. New York. 2007. Page 34.

²³² Barry Hirsch & David Macpherson. 2011. Unionstats.com

density is a crucial factor, in concert with others, in the widening of income inequality in the United States, with as Emmanuel Saez notes, the top 1% of income earners increasing their share of total wages from 5.1% in 1970 to 12.4% in 2007.²³³

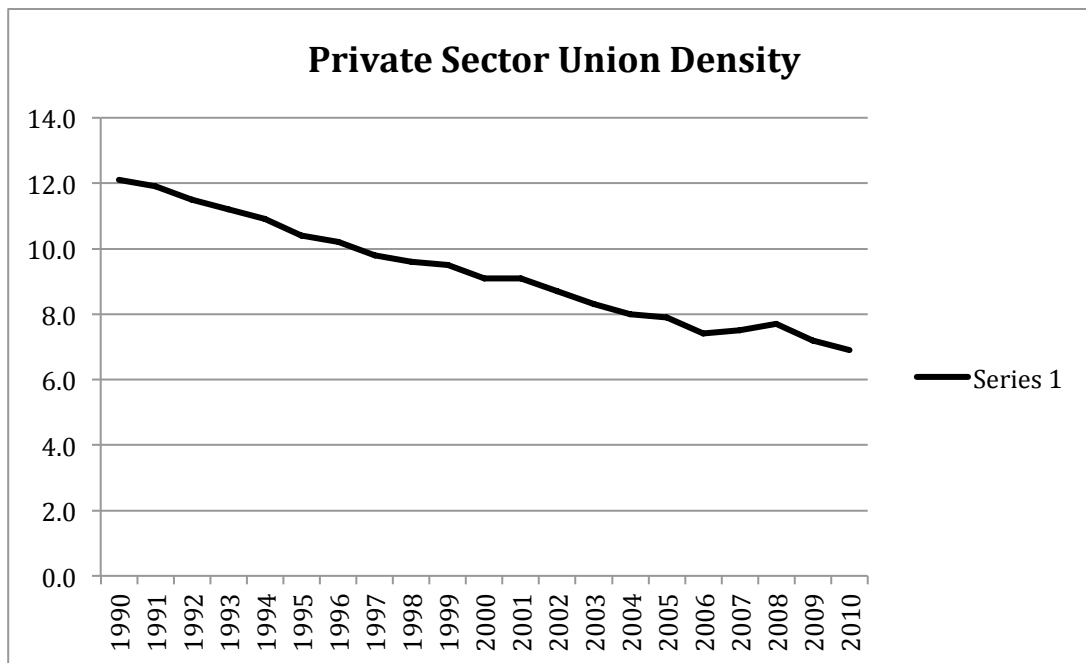


Figure 9: Unionstats.com

The Employee Free Choice Act is designed to streamline the process for union certification by allowing workers to simply sign a card to indicate their preference to be in a union, moving away from the current NLRB process of secret votes and drawn out certification processes. Streamlining the process for certifying a union, moving away from what's currently a tangled and overly business friendly NLRB election process to a system where workers can sign a card, without duress to express their preferences, should at the very least slow the thirty-year slide in American union density. According to recent data out of the Center for American Rights at Work, a labor-based think tank, there are more than 33 million Americans who currently have no protection under the National Labor Relations Act and its provisions.²³⁴ Over the more medium term, hopefully arresting declining union density will have some effect on wages and effective demand.

The NUMMI experience provides confidence that unions, high productivity, and strong quality can go together in an environment of a participative work organization and labor-management cooperation. Preserving access to the middle class is not a social issue that we should bracket or examine separately from the larger processes of global market

²³³ Saez, Emmanuel. "Striking it Richer: The Evolution of Top Incomes in the United States". August 5, 2009. Can be accessed at: <http://elsa.berkeley.edu/~saez/TabFig2007.xls>

²³⁴ American Rights at Work. "The Haves and the Have-Nots: How American Labor Law Denies a Quarter of the Workforce Collective Bargaining Rights". November 2008.

integration; it is an economic imperative that will fuel American innovation for another generation, but only if we choose it.

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