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The geography of auto globalization and the politics of auto bailouts

Jim Stanford

Canadian Auto Workers, 205 Placer Court, Toronto, Ontario, Canada M2H 3H9, stanford@caw.ca

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The global financial crisis had dramatic impacts on auto manufacturing worldwide. However, these were felt uniquely severely in North America, largely because of its asymmetric position within the geography of automotive globalization. North American automakers were already fragile due to one-way trade and foreign direct investment inflows. This history also shaped the nature of the North American policy response. Unlike other jurisdictions, North American governments needed to save leading regional producers from liquidation. Moreover, this rescue took on a unique anti-union tone, through government-mandated renegotiation of labour contracts. The measures taken in North America, while dramatic, are unlikely to resolve the continental industry's deeper structural weaknesses.

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JEL Classifications: F23, J31, L52, L62

Introduction

The global financial crisis of 2008–2009 had dramatic impacts on the world auto manufacturing industry. These impacts included sharp declines in sales of new motor vehicles in many markets and deterioration in the financial situation of automakers around the world. No company, no matter how successful its pre-crisis position, was immune to the sudden drop in global auto sales, compounded by generalized financing constraints, which further undermined corporate stability. In response to the difficulties faced by the auto industry, and the fear that those difficulties could produce major negative economic side-effects at a moment of broad economic weakness, governments around the world acted aggressively to address the plight of their respective auto industries.

While the move to aid the auto sector was near universal, there were key differences in both the content and the political 'tone' of these respective rescue efforts. In Asia, Latin America and Europe, support for national auto industries consisted primarily of significant fiscal stimulus for auto sales (in an effort to moderate the negative impact of the financial crisis on consumer sentiment and expenditure), targeted supports for forward-looking investment and technology initiatives, and wage subsidy measures to minimize lay-offs. These initiatives were relatively uncontroversial in broader political dialogue, reflecting a consensus in most jurisdictions regarding the strategic national importance of the auto sector and domestically located automakers.

The North American auto rescue, in contrast, was unique in several respects. It was the only case in

which governments needed to directly rescue the major automakers and ensure their corporate survival.[1] This made the North American rescue more expensive, and more far reaching, than in other locations. It was the only case in which the rescue effort occurred within the context of a continental market that has come to be dominated by offshore-based producers (through both incoming imports and incoming foreign direct investment [FDI]). And of particular note here, in contrast to other jurisdictions, which subsidized autoworker wages to forestall lay-offs, the North American rescue effort featured an attack on the compensation and conditions of autoworkers, thus undertaking a strong and deliberate challenge to the legitimacy and power of automotive trade unions. The end result, in North America, was a unique association between 'rescuing the auto industry' and 'humbling the auto unions'.

While government interventions may well have assured the continuing survival of the major North American automakers (at least for the medium term), the underlying and uneven pattern of globalization that contributed to the uniquely weak financial position of those firms has, if anything, been accentuated by the events of the crisis. This raises questions about the long-run sustainability of the North American automakers.

This article suggests that these unique features of the North American auto aid package centrally reflected the deeper geographical pattern of automotive trade and FDI, as reflected by higher net imports into North America and the reshaping of the industry through inward FDI. These geographical factors overlapped with labour relations issues, to create the circumstances in which the decidedly anti-union tone of the North American auto bailouts was formulated.

Following this introduction, the next section reviews the geographic and economic pattern of global auto production, trade and foreign investment, as it existed when the global financial crisis occurred. The article then reviews international automotive labour cost differentials and their role (if any) in determining the geography of global auto investment and trade. The third section reviews and compares the various government automotive aid packages that were implemented in the major auto-producing jurisdictions, arguing that differential responses reflected the geographical imbalances that prevailed when the crisis hit.

Setting the stage for crisis: the uneven geography of automotive globalization

Auto manufacturing remains a crucial feature of modern industrial society, more than a century after Henry Ford implemented the assembly line and ushered in the era of mass production. Purchases of new motor vehicles account for around 10% of total consumer merchandise spending in the leading industrial economies (for example Council of Economic Advisors, 2010, table B-16). Motor vehicle purchases are strongly pro-cyclical, leading and exacerbating both downswings and upswings in the broader macroeconomy (Organisation for Economic Co-operation and Development [OECD], 2009a). International trade in automotive products accounts for close to 10% of global merchandise trade (World Trade Organization, 2009). For those countries that possess significant auto assembly capacity, auto exports are especially important in determining overall export and balance of payments performance, as seen in Table 1.

The most auto-dependent countries rely on the sector for as much as a fifth of total exports. As a share of national gross domestic product (GDP), the auto industry's direct share is smaller—up to 3% for the most auto-focused economies, and much less in other OECD countries. And as a share of total employment, the auto industry accounts for an even smaller direct share (the industry's share of employment is typically smaller than its share of GDP, due to the higher-than-average labour productivity demonstrated in auto manufacturing). By the range of measures reviewed in Table 1, Japan, Germany, Canada, Korea and Spain are the most auto-dependent economies in the OECD.

But these direct measures of the auto industry's importance underestimate the strategic role played by the sector because a unique feature of auto manufacturing is its very strong economic linkages

Table 1. *Dependence on auto industry. 2007 or latest available year, major OECD countries.*

	Share of national total		
	Exports	Employment	GDP
Japan	20.2	1.6	2.6
Germany	15.8	2.1	3.4
Canada	14.8	0.9	1.5
Spain	14.3	1.1	1.2
Korea	11.4	1.6	2.5
France	10.5	0.8	0.6
USA	6.8	0.6	0.7
Italy	6.4	0.7	0.6
UK	5.9	0.6	0.7

Source: OECD (2009a), House of Commons (UK), Business and Enterprise Committee (2009, 23).

to other industrial sectors. This includes an intensively developed 'upstream' supply chain, which depends fully on investment and production continuing to occur at the final assembly stage. 'Downstream' macroeconomic spin-off effects are also important, experienced through consumer spending by autoworkers, tax revenues and resulting government spending, and other spending stimuli. The total spin-off employment (including both 'upstream' and 'downstream' effects) generated by manufacturing at the vehicle assembly stage has been estimated at around eight jobs in total, for each job in vehicle assembly (for example Centre for Spatial Economics, 2008; McAlinden et al., 2003; New Automotive Innovation and Growth Team, 2009, 25). Because of those spin-off effects, the sector carries a disproportionate economic importance.

The global automotive industry demonstrates a complex and in some ways surprising geography (Sturgeon and van Biesebroeck, 2009). While international trade flows are important, the industry still demonstrates a significant regionalization of production and investment—and hence has not been fully 'globalized'—to the same degree as other manufacturing sectors (such as electronics or textiles). The industry is highly global in the sense that it is dominated by a handful of global original equipment makers (OEMs) that sell their products in all major markets, and that increasingly plan their technological, production and marketing operations at a global level. Yet, most automakers indicate a preference to continue to produce nearer to their final markets, and this causes a continuing regionalization of production. These regional production strategies reflect a mixture of economic and political influences. The former include the importance of transportation costs (trans-ocean shipping adds as much as 10% to the cost of a finished vehicle), an effort to reduce exposure to exchange rate volatility, and the agglomerating effect of tightly managed supply chains (including the trend towards just-in-time components production and delivery systems that require tight logistics and transportation planning, and hence are not amenable to global components sourcing). Political influences on investment location include a desire to avoid trade protection in key markets, thus stimulating FDI as an alternative to international trade flows.

The globalization of the automotive sector, therefore, takes numerous forms. Global (or interregional) trade in finished vehicles and components is important, depending on which regional markets are considered, and the leading OEMs clearly 'think globally' in their management and marketing. For example, it is now commonplace for OEMs to produce several different vehicles, customized for different regional markets, from a single standardized global 'platform'.[2] In the developed countries, the largest of these OEMs are headquartered in the USA, Germany and Japan; smaller headquarters concentrations exist in Korea, France and Italy. Due to take-overs and mergers, indigenous OEMs have largely disappeared from secondary auto-producing countries (such as the UK and Sweden). The leading OEM groups concentrate their high-level design, scientific, and management functions near to their home headquarters, although there has been some decentralization of research, engineering and design functions in recent years to major markets. China and India have also developed emerging home-grown OEM capabilities over the past decade; these firms often operate in partnership with OEMs based in the industrialized countries, but some (such as China's Shanghai Auto and Geely, and India's Tata) are also building the capacity to independently develop new products and

to globally produce and market their own product line-ups.

FDI by these globally integrated OEMs is another important dimension of automotive globalization. Each major OEM undertakes FDI and hence production in each of the major regions that make up the global market. Finally, the OEMs have further globalized their operations through partnerships with other OEMs. These partnerships became very common and interlocking in the 1990s. They may involve the purchase or 'swap' of minority equity interests, the sharing of technical, engineering or marketing resources, or the outright take-over of one OEM by another. Through this process of global consolidation, dominant OEMs took over smaller manufacturers, with the result that companies such as Volvo, Saab, Daewoo, MG and Jaguar Land Rover ceased to exist as independent firms, being integrated instead into the global operations of larger parent firms.

In sum, through a combination of global management systems, international trade (in vehicles and components), FDI (and the establishment of direct manufacturing subsidiaries) and complex interlinking global partnerships, the major OEM groups have gained access to market opportunities in each of the dominant market regions. The resulting pattern of globalization is complex and multilayered. It is also markedly uneven. Even within the developed industrial countries (let alone along North–South lines), the flows of capital and finished products that occur within this global pattern are not at all symmetrical—and this asymmetry profoundly contributed to the varying manners in which the global financial crisis affected the auto industry in different parts of the world.

Traditionally, prior to the emergence of large auto industries in the BRIC economies, there were three dominant regional auto markets in the developed world: North America, the EU and East Asia (Japan and Korea). Each possesses a cluster of indigenous but globally oriented OEMs. But these three regions have demonstrated very different trajectories in recent years, in terms of the vitality and financial success of their respective domestic OEMs, and the resulting pattern of international trade and investment. Table 2 reports auto production and sales in the major markets, and also calculates apparent net exports in each jurisdiction: the difference between domestic production and domestic sales. This difference, which is positive if production exceeds sales, is a summary metric of the extent to which a jurisdiction 'holds its own' in global auto trade—that is, produces proportionately to its own domestic demand.

Among these three dominant regions, the Japanese and Korean auto industries have demonstrated the most expansive and asymmetrical reach into the rest of the world. Japanese and Korean OEMs have benefited from largely closed domestic markets (offshore imports account for less than 5% of sales in those two countries, and domestically based OEMs control well over 90% of each national market—see Table 3). That safe home base in turn became the launch pad for vibrant export success. The result has been the creation and maintenance of substantial net export surpluses in automotive trade. North America is the most important market for outbound Japanese and Korean exports, but significant volumes also flow to Europe and to the rest of the world. Before the global financial crisis, this net export surplus exceeded 9 million units, equivalent to over 100% of domestic sales; in other words, Japan and Korea produced more than twice as many vehicles as they consumed domestically. Despite a fall in net exports to the key North American market in 2007 and 2008 triggered by shrinking sales there, hence producing slower growth in both Korea and Japan (see Bailey et al., 2007), Japan and Korea's auto industries nevertheless maintain large net export flows, and government economic policy in both countries continues to emphasize support for export-oriented, technology-intensive manufacturing.

At the same time, the Japanese- and Korean-based OEMs have supplemented these net exports with a growing portfolio of FDI in other producing regions, sparked by both economic and political considerations. This outgoing foreign investment has been focused on North America—where the Japanese and Korean market share has grown most quickly over the past 15 years. Japanese and Korean

Table 2. *Pre-crisis trends in automotive production and sales.*

	Production			Sales			Apparent net exports			
							Units		As % domestic sales	
	2008	2004	Change (%)	2008	2004	Change (%)	2008	2004	2008	2004
USA	8.67	11.99	−27.7	13.49	17.30	−22.0	−4.82	−5.31	−35.7	−30.7
Canada	2.08	2.71	−23.2	1.67	1.57	6.3	0.41	1.14	24.4	72.2
Mexico	2.17	1.55	39.5	1.07	1.12	−4.5	1.10	0.43	102.5	38.6
All North America	12.92	16.25	−20.5	16.24	19.99	−18.8	−3.31	−3.74	−20.4	−18.7
Brazil	3.22	2.21	45.7	2.87	1.56	83.3	0.35	0.65	12.3	41.3
Germany	6.05	5.57	8.5	3.43	3.55	−3.5	2.62	2.02	76.5	56.9
France	2.57	3.67	−30.0	2.57	2.47	4.0	−0.01	1.19	−0.2	48.2
Italy	1.02	1.14	−10.3	2.43	2.53	−3.9	−1.41	−1.39	−57.9	−54.8
Spain	2.54	3.01	−15.6	1.36	1.89	−28.0	1.18	1.12	86.5	59.3
UK	1.65	1.86	−11.1	2.49	1.96	27.0	−0.84	−0.10	−33.6	−5.2
Belgium	0.72	0.90	−19.5	0.61	0.55	11.1	0.11	0.35	18.0	62.9
All West Europe	15.31	17.20	−11.0	15.77	16.80	−6.2	−0.46	0.39	−2.9	2.3
Russia	1.79	1.39	29.3	2.91	1.53	90.1	−1.11	−0.14	−38.3	−9.2
Turkey	1.15	0.82	39.3	0.53	0.50	5.1	0.62	0.32	117.4	64.0
Other East Europe	3.68	1.89	94.2	1.23	1.25	−2.1	2.45	0.64	199.3	50.9
All East Europe	6.62	4.11	61.2	4.66	3.29	41.9	1.96	0.82	41.9	24.9
Japan	11.56	10.51	10.0	5.08	5.76	−11.8	6.48	4.75	127.5	82.4
Korea	3.83	3.47	10.3	1.22	1.09	11.1	2.61	2.37	214.7	216.9
Japan and Korea	15.39	13.98	10.1	6.30	6.86	−8.2	9.09	7.12	144.4	103.9
China	9.51	5.07	87.5	9.54	5.07	88.1	−0.03	0.00	−0.4	0.0
India	2.32	1.51	53.2	1.98	1.34	47.3	0.34	0.17	16.9	12.4
Australia	0.32	0.41	−20.0	1.01	0.96	6.0	−0.69	−0.55	−68.0	−57.6

Source: Author's calculations from Ward's Automotive (2010) database.

Table 3. *Share of regional sales from regionally headquartered OEMs.*

	2005 (%)	2008 (%)	Change (%)
North America	55.4	46.7	−8.6
Western Europe	60.6	62.5	1.9
Japan and Korea	93.1	92.7	−0.4

Source: Author's calculations from Ward's Automotive (2010) database.

OEMs now operate 25 vehicle assembly plants in North America, which together account for close to 40% of all North American vehicle production. A smaller network of these 'transplant' facilities also operates in Western Europe; a half-dozen major Japanese-owned facilities (half of them in Britain) account for less than 10% of total European vehicle production. Like automotive trade flows, this FDI flow is largely one way and outward in nature; there is almost no incoming FDI in the auto industry in either Japan or Korea.

North America's production and trade performance reflects the opposite extreme from the East Asian experience: a growing dependence on net automotive imports and the growing importance of incoming automotive FDI. Some of those imports were sourced from Europe, but most (80% in recent years) came from Japan and Korea. Net imports of new vehicles equalled roughly one-fifth of continental domestic sales before the global financial crisis; this net import penetration grew significantly during the crisis of 2009 (as the sales of North American OEMs fell more dramatically than other producers). Exports of automotive products from North America to the rest of the world are small, offsetting only a minor fraction of the continent's automotive imports.

In addition to the 25 Asian-owned assembly plants in the USA, BMW, Daimler and Volkswagen each operate one vehicle assembly plant in North America. The combination of significant net imports (averaging close to 4 million vehicles per year) and inbound FDI by offshore OEMs is reflected in a substantially reduced domestic market share held by the North American-based OEMs in their 'home' market. As indicated in Table 3, by the time of the financial crisis the North American market share of the three North American OEMs had declined to 47%—down by 9 points in just 3 years. The combination of lost market share, falling output and sales, and high fixed costs resulted in huge corporate losses. The three North American OEMs incurred net losses totalling over US$100 billion between 2005 and 2008, virtually exhausting the equity base of all three companies. Even prior to the financial crisis, therefore, the viability of the North American OEMs was already in question as a result of their asymmetrical integration into the globalizing auto industry.

The loss of domestic market share by the North American OEMs (and their parallel failure to 'crack' foreign markets, especially those in Asia, with outbound vehicle exports from North America) reflects a deep and multidimensional loss of competitiveness on their part in the eyes of consumers (both at home and abroad). Many factors have contributed to that loss of competitiveness. It is not primarily that North American vehicles are 'too expensive'; indeed, the products of the North American OEMs sell at a discount in their home market to both European and Japanese brands. Labour costs in the North American industry are not generally higher than in Europe and Japan (an issue that will be discussed below). For some years, the quality of North American-branded vehicles was seen to lag according to surveys by organizations such as *Consumer Reports* or J.D. Power and Associates. This quality gap has been mostly closed, however, reflecting intense efforts to boost quality and reliability. Similarly, the North American OEMs developed a reputation for less innovative and appealing technical and design features. In this regard, corporate losses can spark a negative cumulative cycle in which a lack of profits (and hence a lack of internally available funds) leads to less investment in innovation and design, less appealing vehicles and hence further loss of market share—leading to even worse financial losses.[3] Much automotive innovation in recent years has been focused on addressing the environmental challenges associated with motor vehicle use (Kohler et al., 2008); the slowness with which North American OEMs addressed environmental concerns, lagging the Japanese OEMs in particular in the development of alternative fuel systems, is another key dimension of their technological weakness.[4]

Whatever these complex and multi-variate causes of the erosion of market share for the North American OEMs, it would seem far-fetched to blame 'bad management' or other company-specific factors for the decline of an entire continental industry. Rather, the universal failure of the North American OEMs would seem to reflect the deep structural asymmetry embodied in North America's automotive relationship with the rest of the world. North America is the only major vehicle market to satisfy so much of its demand (one-third in 2009) from imported vehicles, the only region in the developed world where 'home-grown' OEMs control only a minority of the domestic market, and the only region in the developed world where so much domestic automotive production is undertaken through foreign-owned facilities. In this context, the onset of the global financial crisis only exacerbated a deeper problem faced by the North American auto industry—and accelerated a day of reckoning for North American OEMs that would have eventually occurred anyway.

Unlike the one-way inflow of vehicle imports into North America, the flow of automotive FDI does go in both directions to and from the continent. The North American OEMs possess a portfolio of foreign investments in other producing regions—although less extensive than for the Asian-based OEMs. Two of the North American automakers (General Motors [GM] and Ford) have developed extensive networks of directly owned assembly plants in offshore locations including Europe (where GM's Opel division and Ford established

a significant production presence during the initial post-war decades), Latin America and, more recently, China. Apart from GM's recent purchase of Korea's then-bankrupt Daewoo, the North American OEMs do not have direct investments in Japan or Korea (although Ford has a minority ownership equity partnership with Mazda). While these global FDI assets and equity partnerships have helped to diversify the financial base of the North American OEMs, auto production in North America has not benefited directly from the globalization of the parent firms' operations and investments, in the same way as has occurred in Japan, Korea and Europe: there has been almost no outgoing export flow from North America to offset the large inflow of imports, despite significant outward FDI by those companies.

The pattern of incoming FDI into North America reflects a combination of labour relations and geographical motivations. Almost all of the offshore 'transplant' facilities in North America were established as new 'greenfield' plants, beginning in the 1980s. In the US case, all recent plants have been established in Southern states (including Mississippi, Alabama, North and South Carolina, and Texas) which have implemented anti-union 'right-to-work' laws.[5] The first Japanese transplant facilities were built in the Midwestern US states and in Canada, where traditional Wagner Act-style labour laws prevail. However, the Japanese-based producers have nevertheless maintained a union-free status. This was achieved partly through the practice of broadly matching the active wages and benefits paid in nearby unionized facilities of the North American OEMs.[6] North American labour law (which requires a union to achieve 50% support before obtaining any bargaining rights or plant access) and a general chilling of public attitudes towards unions have also undermined efforts to unionize the transplant operations. On the whole, the offshore-owned assembly industry in North America has remained mostly union free. This is in contrast to the experience in Mexico and other regions (including Europe, Latin America and Australia), where the factories of Japanese-based OEMs have been unionized (like other auto facilities).

Another geographical aspect of the evolution of the North American auto industry has been a notable 'southward' shift in the locus of investment and production in recent decades. Since 1994, trade in vehicles and components within North America has been fully liberalized under the North American Free Trade Agreement. As noted, the new non-union facilities operated by Asian and European OEMs have been concentrated in the right-to-work states of the US South. And the North American OEMs have shifted a larger proportion of their continental output to low-wage Mexico—taking advantage of Mexico's new tariff-free access to the rest of the continent, and the emerging supply chain and infrastructure capability that the Mexican industry has come to demonstrate. By 2008, Mexico surpassed Canada as the second largest auto producer on the continent, and Mexico maintains a substantial net export surplus in automotive products.

Europe's automotive industry constitutes a third type—lying between the East Asian experience (characterized by large net exports and outgoing FDI) and the North American pattern (characterized by large net imports and mostly incoming FDI). As Table 3 shows, together European-based OEMs control close to two-thirds of the European new vehicle market, and that share has remained stable. In addition, Europe is a significant vehicle exporter to North America and other world markets. This has allowed Europe to retain a largely balanced position in global trade in vehicles, with these exports broadly offsetting Europe's imports of finished vehicles (mostly from East Asia).

However, while Europe as a whole has succeeded in retaining a largely balanced position in the global auto manufacturing complex, within Europe there has been an evident migration of investment and production towards lower cost jurisdictions. Initially, the Southern EU member countries (especially Spain) were the preferred location for new automotive FDI, motivated by the search for lower labour costs. More recently, however, facilitated by EU enlargement, Central and Eastern Europe have become attractive as a low-cost location for new export-oriented automotive investments. Not counting Russia, automotive

assembly in the former Communist countries of Eastern Europe doubled between 2004 and 2008 (Table 2). The region now generates net exports of over 2 million vehicles—most of which are destined for Western Europe. This development was key in the emergence of a (small) auto trade deficit for Western Europe by 2008. It has also clearly accentuated downward pressures on labour costs in the established manufacturing facilities of Western Europe.

The most dramatic change in the geography of global auto production in recent years has been the rise of the BRIC nations as fully fledged automotive powers. China's spectacular expansion, of course, has been most impactful. Chinese auto production expanded 10-fold in the past decade. China now constitutes both the largest market for new vehicles (surpassing the USA by 2009) and the largest producer (surpassing Japan at the same time). The global financial crisis hardly slowed down this dramatic growth in China; in fact, due to the aggressive stimulus policies of the Chinese government (which included strong measures to reduce credit costs for new car loans and to subsidize the purchase of smaller, more fuel-efficient vehicles), China's vehicle production and sales both grew rapidly in 2009 (by around 45% for both in a single year), as the rest of the world staggered. Growth in 2010 is expected to be a further 20%. To date China's auto development has been almost entirely self-centred: with both domestic sales and production growing so rapidly and in tandem, there has been no major import or export flows to or from China. However, Chinese automakers are developing the capacity and the infrastructure for vehicle exports to the rest of the world. Chinese policy promotes the rapid consolidation and upgrading of China's auto producers. Incoming FDI by global OEMs is encouraged, but strict requirements for technology transfer and joint venture arrangements with Chinese partners are leveraging this incoming FDI into a growing capacity by Chinese-based firms to undertake increasingly complex technological and management functions on their own. State-funded technology, research and infrastructure investments round out the picture of an industry that is surging ahead both qualitatively and quantitatively.

The same pattern of self-reliance is largely true of the other BRIC producers. India and Brazil have maintained small net export surpluses, but the main bulk of their rapidly rising production has been oriented around sales to their vibrant domestic markets, with India becoming the largest market for small cars in 2009. Russia's auto industry also experienced rapid growth over the past decade—however, it was hit harder by the global financial crisis than any other auto-producing region in the world (including the USA), with both sales and production declining by half in 2009. Russia responded much slower than other jurisdictions to the crisis, not bringing in supports for the industry (including sales incentives and investment supports for Russian manufacturing facilities) until 2010.

Table 4 provides a striking summary of the dramatic changes in the geography of the global auto industry. It compares the ranking of the 10 largest auto-producing jurisdictions in 2009 with the same ranking a decade earlier. China has surged to the top of the list; Brazil and India are halfway up. Japan, Korea and Germany all broadly maintained their relative positions despite the global turbulence around them. Other developed producers declined notably: Spain and France sank down the list, whereas Italy and the UK fell right off. It is in North America, however, that the decade was felt most painfully: production was more than halved in the USA and Canada (and Canada was removed from the top 10 ranking), while Mexico captured a growing share of continental production.

In terms of the relationship between auto globalization and labour costs, a tendency towards the concentration of production in lower cost jurisdictions is visible, although not in the simplistic terms enunciated by a 'race-to-the-bottom' hypothesis (in which all investment flows to the lowest cost producers). Expansion in China, Brazil and India has been associated so far with domestic consumption (not exports). Production in the rest of the world also remains largely regionalized within continental markets (the most notable exception being North America's large imports from Japan and Korea).

Table 4. *Changing rankings of top automakers (annual production, million units).*

1999		2009	
USA	13.0	China	13.8
Japan	9.9	Japan	7.9
Germany	5.7	USA	5.7
France	3.2	Germany	5.2
Canada	3.1	Korea	3.5
Spain	2.9	Brazil	3.2
Korea	2.8	India	2.6
UK	2.0	Spain	2.2
China	1.8	France	2.0
Italy	1.7	Mexico	1.6

Source: Author's calculations from Ward's Automotive (2010) database.

Within Europe and North America, however, production has clearly migrated towards lower cost jurisdictions, facilitated by regional free trade agreements.

Automotive labour costs in global perspective

As described above, the pattern of automotive globalization reflects a complex mixture of motives and channels—including international trade, FDI, globalized management strategies and a network of partnerships between competing OEMs. In this context, the correlation between labour costs and global trade and investment patterns is also complex and subtle. Automotive globalization does not reflect a unidimensional migration of investment and production towards low-wage producing regions—although elements of that cost-reducing pressure are certainly present. Moreover, competitiveness in motor vehicle sales depends on a complex range of factors: purchase price, operating price, quality and technological criteria. Vehicle sellers do not compete primarily on grounds of offering the lowest selling price (indeed, the most financially successful OEMs are those that have successfully developed their brands, and their prices, as 'premium'). Finally, automotive investment is not instantaneously mobile; even a low-cost region must develop a complex supply network, infrastructure, and demonstrated quality and logistics capabilities before it becomes attractive as a site for automotive investment. This is possible (as in Mexico and Eastern Europe), but it takes time and effort; it cannot be accomplished simply by closing a plant in a high-cost region and opening a new one in a lower wage location.

The governments of both the USA and Canada demanded that their respective auto unions (the United Auto Workers [UAW] in the USA and the Canadian Auto Workers [CAW] in Canada) renegotiate labour contracts as a condition of providing financial aid to the two large OEMs (GM and Chrysler), which sought bankruptcy protection during the crisis. The governments' demand was based on a stated belief that unduly high labour costs must have been relevant and important in the failed performance of the North American OEMs. Indeed, the claimed link between labour costs and corporate failure was made explicitly in government analyses of the automotive crisis conducted in the two countries (see House of Commons [Canada], Standing Committee on Industry, Science and Technology, 2009; Office of Transportation and Machinery, 2009; White House, 2009a, 2009b).

How do North America's auto labour costs compare to those in other producing jurisdictions, and might high labour costs indeed explain the unfavourable asymmetries in trade and foreign investment that were described in the preceding section? Table 5 summarizes data on hourly compensation costs in automotive manufacturing in several major jurisdictions, assembled by the US Department of Labor's Bureau of Labor Statistics (BLS). This is the only source for direct international comparisons of wages and compensation costs, and it is not comprehensive. According to the US data, Germany demonstrates the highest labour costs (over US$50 per hour in 2007), followed by Belgium, Canada, Austria and the UK. US costs rank in the middle range of the 18 countries surveyed, along with other industrialized countries (such as France, Australia, Italy, Spain, Japan and Korea). Not surprisingly, developing economies such as Eastern Europe, Brazil and Mexico report the lowest hourly labour costs.

Table 5. *Automotive labour costs.*

	At actual exchange rate		At PPP exchange rate		As proportion of all manufacturing workers (%)
	Hourly compensation costs (US$, 2007)	Share of US level (%)	Hourly compensation costs (US$, 2007)	Share of US level (%)	
Western hemisphere					
USA	33.23	100	33.23	100	131
Canada	40.38	122	35.82	108	139
Mexico	3.95	12	5.74	17	135
Brazil	11.36	34	15.79	48	191
Western Europe					
Germany	52.22	157	44.47	134	135
France	32.89	99	26.34	79	115
Spain	28.48	86	28.02	84	136
UK	35.79	108	27.66	83	119
Italy	28.78	87	24.64	74	102
Belgium	41.69	125	34.12	103	118
Austria	38.96	117	32.38	97	110
Eastern Europe					
Czech Republic[a]	11.53	35	16.64	50	119
Hungary	8.95	27	12.30	37	136
Poland	7.73	23	11.30	34	124
Asia					
Japan[b]	25.42	76	24.93	75	106
Korea	21.10	63	26.14	79	132
Taiwan	7.48	23	12.73	38	114
Australia	31.75	96	26.56	80	105
Standard deviation	14.25		10.12		

Source: Author's calculations from Bureau of Labor Statistics (2009), OECD (2009b) and World Bank (2007).
[a]Compensation for all employees (not just production workers).
[b]Estimate based on 2005 data (latest published) escalated by growth of total manufacturing hourly compensation cost between 2005 and 2007. Excludes profit-sharing bonuses that can add US$10 per hour to total compensation.

It is important to note that the US BLS data significantly underestimate Japanese hourly labour compensation, a large portion of which consists of large lump sum annual performance bonuses. In good years for employees of the Japanese OEMs, these bonuses can amount to the equivalent of around $10 per hour worked. Especially when these bonuses are considered, Japan's labour costs are not low, and the export success of Japanese-based OEMs cannot be credibly ascribed to a labour cost advantage.[7]

It is also interesting to note from Table 5 that Korea's labour costs have grown dramatically over the past two decades, reflecting both the vibrant international success of Korean products and the Korean tradition of militant trade unionism. Indeed, if labour costs were the primary determinant of international automotive competitiveness, Korean producers should have become much less successful in global automotive trade. More recently, Korean automakers have attempted to more tightly restrain labour cost growth at home. The employers' bargaining power has been reinforced by their investments in foreign assembly plants (and their consequent ability to threaten Korean unions with disinvestment). Ironically, new union-free transplant facilities opened in recent years by Hyundai and Kia in the US Deep South are considered by company managers to have preferable labour relations and even lower costs (not to mention a more docile and predictable work culture) than Korean facilities (Jung and Clark, 2007).

Not surprisingly, given the ongoing shifts in production, Table 5 verifies that Mexico and Eastern Europe do indeed enjoy substantial labour cost advantages relative to the other parts of those two integrated continental markets. Mexico's hourly labour costs are around one-tenth of those prevailing in Canada and the USA. Eastern Europe's hourly labour costs are around one-quarter of those paid in the highest cost Western European regions. Especially if combined with the successful development of supply chains and infrastructure, and the achievement of acceptable outcomes in quality and productivity, those labour cost differentials would certainly seem significant enough to motivate a shift in the geography of investment and production within those two unified continental markets. To the extent that Japanese and Korean OEMs are able to gain access to export-oriented FDI opportunities in lower cost producing regions of the broad East Asian region (such as Thailand, the Philippines and others), then a similar dynamic of labour-cost-reducing investment migration might become more visible within Asia as well, complementing the more prevalent investments that have been made in transplant facilities near final markets in North America and, to a lesser extent, in Europe.

Of course, manufacturing competitiveness does not only depend on labour cost competitiveness—and labour cost competitiveness does not only depend on hourly compensation. Indeed, direct labour costs at the assembly level account for less than 10% of the total operating expenses incurred by automotive OEMs (Stanford, 2009).[8] Productivity performance is also an important determinant of regional competitiveness, partly due to its effect on unit production costs, and partly to its association with innovation and quality indicators (Gardiner et al., 2004). If compensation differentials proportionately reflected productivity differentials, then no unit labour cost differentials would arise to motivate relocation of investment and production. However, production methods and technology are more company specific than location specific and hence can be transferred from one jurisdiction to another with minimal impact on productivity and quality outcomes. Scope for substituting labour for capital is very limited in the context of a modern automated automotive manufacturing facility and hence facilities in low-labour-cost jurisdictions demonstrate productivity outcomes not dissimilar to those in high-labour-cost jurisdictions. For example, in 2007 it required on average 28 hours of labour input to assemble a vehicle in Mexico, compared to 23 hours in the USA (author's calculation from data reported in Harbour and Associates, 2008). In other words, Mexican assembly labour is 82% as productive as US assembly labour, even though (according to Table 5) it is paid only 12% as much. The modest Mexican disadvantage in average productivity therefore offsets only a tiny fraction of the much larger differential that prevails in hourly compensation costs between Mexico and the USA.

Another interesting dimension to the data presented in Table 5 is the extent to which international labour cost differentials reflect volatility in foreign exchange markets. The middle columns of Table 5 recalculate relative hourly labour costs for the same jurisdictions, utilizing estimates of the purchasing power parity (PPP) value of the relevant exchange rates.[9] In a world where exchange rates reflected fundamental values,[10] labour cost differentials would be significantly smaller. As indicated in Table 5, the standard deviation of hourly compensation costs evaluated at PPP exchange rates is about 30% smaller than the corresponding standard deviation measured at actual 2007 exchange rates. In other words, about 30% of labour cost divergence in the global auto industry reflects financial and speculative pressures in currency markets; the other 70% could be attributed to more fundamental differences in economic and institutional conditions across producing jurisdictions. Currency markets, and the divergence between market and 'fair' values for exchange rates, are thus seen to notably widen global labour cost differentials.

On the whole, then, this analysis indicates that labour cost differentials and the corresponding migration of investment have been relevant factors in reshaping the geography of auto production—but in particular limited ways. The major impact of labour

cost differentials evident so far has been in shifting the location of automotive investment and production *within* North America and *within* Europe (towards Mexico and the Deep South of the USA, in the former, and towards Central and Eastern Europe in the latter). Labour cost differentials, however, have not been important in explaining the *inter-regional* flows of finished vehicles and FDI between East Asia, North America and Europe. And of particular relevance here, labour cost differentials would not appear to be a dominant factor in explaining the uniquely poor performance of the North American OEMs relative to their Japanese, Korean and European counterparts. US automotive labour is not expensive in global terms (relative to Western Europe, Japan and, even now, Korea). Moreover, the North American OEMs have unlimited access within a unified continental market to Mexican auto labour that is less expensive than any in Europe, Japan or Korea.

Some important caveats must be expressed with respect to this conclusion.[11] One particular financial challenge facing the North American OEMs has been the growing cost of retirement-related benefits. These include defined benefit pension plans, most of which experienced large funding deficits in recent years (due to unfavourable financial returns, changing actuarial experience and other factors). Also, the OEMs have paid for supplementary health benefits for retirees (based, until now, on a simple pay-as-you-go funding model that became unsustainable as active employee headcounts shrank dramatically relative to a burgeoning retiree population). Funding gaps in these retirement programs have become a major financial burden on the US operations of the North American OEMs and to a lesser extent in Canada as well. These extra costs of retirement-related benefits incurred by the North American OEMs have added an extra dimension of labour cost burden to their operations (and are not reflected in Table 5, which refers to active employee compensation only). Other OEMs do not incur those retirement-related 'legacy' expenses: in their home plants in Europe and Asia, these costs are largely borne by the state, and their FDI facilities in North America are too new (established within the past quarter century) to have incurred any significant retirement-related costs.

The final column of Table 5 also notes the ratio of automotive compensation costs to the average compensation paid in the entire manufacturing sector. This ratio thus reflects the extent to which autoworkers constitute a privileged 'elite' within the broader industrial labour market. That might in turn influence the extent to which governments would attempt to target or isolate autoworkers, in the course of implementing their broader auto policy interventions. Table 5 confirms that autoworkers are paid better than other manufacturing workers in all major auto-producing jurisdictions. This reflects the higher labour productivity typical of automotive production, the power of auto unions and the demanding nature of work in a heavy industrial setting (Pedersini, 2003). Of the countries included in Table 5, the gap between autoworkers and the rest of the manufacturing workforce is largest in Brazil, where auto compensation is almost twice as high as in the overall manufacturing sector. In many other jurisdictions the 'premium' paid to autoworkers is around one-third: including all three North American countries, Germany, Spain, Korea and Eastern Europe. In a few countries, there is a much smaller gap between autoworkers' compensation and that of other manufacturing workers—including Japan, Australia and Italy. (In Japan's case this ratio significantly understates the gap between autoworkers and other manufacturing workers, due to the extent that annual bonuses are larger in the auto industry.) By this analysis, then, North American autoworkers do not constitute a distant 'elite', relative to the compensation of other manufacturing workers, any more than do autoworkers in much of Europe, Korea or even in developing countries (like Mexico and Brazil). Therefore, the unique attack on auto compensation that featured so prominently in the North American auto rescue effort would not seem to be the result of inter-sectoral wage differentials, any more than they were the result of international wage differentials.

The onset of crisis and the policy response

New vehicle sales began to decline rapidly in most markets in the third and fourth quarters of 2008, in the wake of the spectacular financial events of September that year and their negative impact on both consumer sentiment and the availability of consumer credit. Automakers around the world experienced a dramatic deterioration in financial performance. But that crisis was experienced most acutely by the North American OEMs, already labouring under the burden of US$100 billion in accumulated losses over the previous 4 years and experiencing continued shrinkage of market share in their home market. The decline in sales by the North American OEMs was reinforced by the dramatic surge in gasoline prices, which was also experienced in mid-2008 (reflecting the global commodity price bubble that pushed the price of crude oil to US$150 per barrel at peak). In response to much higher gasoline prices, the North American market experienced a visible but mostly temporary shift towards the sale of smaller, more fuel-efficient vehicles (reflecting both higher fuel prices and growing environmental consciousness among consumers). This shift hurt the North American-based OEMs hardest since they were the most dependent on larger vehicle offerings in their portfolios, but other companies were also affected (in particular, Toyota and Nissan).

Fearing the broader economic side-effects of a collapse of the auto industry, governments around the world enacted a range of supportive measures beginning in late 2008 and early 2009 to assist their respective auto industries through the worst of the crisis (see Table 6). On the demand side, most countries implemented fiscal incentives for new car purchases, consisting of cash subsidies and/or sales tax exemptions. These incentives were largest in the USA (up to US$4500 per vehicle) and Germany (up to 2500 euros per vehicle). More modest sales incentives were implemented in most other auto-producing jurisdictions. These incentives served to encourage new purchases despite economic uncertainty (and the often-restricted availability of consumer credit). They were also often accompanied by an environmental aspect, being tied to the scrappage of older, more polluting vehicles in most countries.

Ironically, thanks to the temporary fiscal incentives for new vehicle purchases, vehicle sales in some markets (including Germany, Brazil, France, Korea and, most spectacularly, China) actually increased in 2009 compared to year-earlier levels (see Table 7), despite the recession. This temporary surge in vehicle sales was later offset by subsequent weakness in markets such as in Europe in 2010 (since the incentives served to 'bring forward' purchases). Nevertheless, such incentives were effective in moderating the immediate decline (and corresponding financial crisis) during the worst phase of the financial and economic crisis. In the hard-hit US market, final sales declined by about one-fifth for 2009 as a whole compared to 2008 (which was itself a weak sales year). Even that decline was much less severe than the 45–50% year-over-year declines that had been experienced in the initial months of the financial crisis. Strong sales later in the year, motivated by the large US 'cash-for-clunkers' incentives, helped to stabilize the industry—benefiting dealers and auto financing companies, as well as OEMs and components manufacturers. Nevertheless, sales across North America declined significantly more than in most of Europe, Japan and Korea—and this added to the financial crisis facing the North American OEMs.

On the supply side of the industry, most auto-producing jurisdictions also introduced various measures to ease the financial situation facing auto companies. Aid was focused on OEMs, but in many cases financial assistance was also available for components manufacturers. These industry supports included emergency financing and loan guarantees to avoid an immediate liquidity crisis, as well as targeted subsidies or 'soft' loans tied to longer term investments by recipient companies in new technology (again, often with environmental applications), products or capital equipment.[12] Table 7 also summarizes the change in vehicle production experienced in the major jurisdictions during 2009. US production fell by over one-third during the

Table 6. *Summary of government policy interventions to support auto industry.*

Country	Intervention
USA	US$4500 per vehicle rebate programme for purchases of vehicles that replace vehicles at least 10 years old and that improve fuel efficiency. Financial support for bankruptcy restructuring of GM and Chrysler, including loans, debtor-in-possession financing, loan guarantees and equity investments totalling US$81 billion. Department of Energy loans to invest in design and US manufacture of energy-efficient vehicles and components, up to $25 billion (including $5.7 billion received by Ford). $5 billion Auto Supplier Support Program. Sales incentives up to $12,500 per vehicle for alternative-fuel vehicles (including natural gas and hydrogen). Financial support for OEM financing units through bank restructuring program. Government guarantee of GM and Chrysler warranties on new vehicles sold during the restructuring process. Numerous state-funded grants and loans for new capital spending by automakers in several states.
Canada	Financial support for bankruptcy restructuring of GM and Chrysler, including loans, debtor-in-possession financing, loan guarantees and equity investments totalling CDN$14 billion. CDN$300 per vehicle incentive for retiring old vehicles. Automotive Innovation Fund, and parallel Ontario provincial fund, covers up to 20% of new capital spending by automakers.
Mexico	2 billion pesos financing assistance to auto assemblers and component makers to maintain production and avoid lay-offs. Development bank provides US$400 million loan to Fiat for new model.
Brazil	Federal and state banks provide loans for new vehicle purchases on preferential terms. State bank provides 4 billion reals in liquidity to support new car loans. National Development Bank provides emergency liquidity and export financing to auto firms. Temporary tax incentives for automakers to maintain production, and temporary sales tax rebates for new vehicle buyers.
Germany	Trade-in allowance for new vehicle purchases of 2500 euros per vehicle; total cost 5 billion euros. 300 million euro emergency financing loans for Opel. 1.5 billion euro further assistance for restructuring of Opel (along with 1.2 billion euros from other European governments, including UK, Spain, Poland and Austria). Short-work plan tops up incomes for partially laid-off workers to 67%.
France	7 billion euros in emergency financing to Peugeot and Renault in February 2009, on condition of maintaining French facilities. State subsidies for partial shutdowns and short-workweek arrangements (with 75–95% pay) at several assembly plants. 8.9 billion euro 'grand loan' to finance capital investment in high-tech industries including auto. Pledge to use equity state holdings in key firms (including Renault) to protect French jobs. Use of US$28 billion sovereign Strategic Investment Fund to support domestic industry (including auto). Scrappage incentive for new vehicle purchases, up to 1000 euros per vehicle. State guarantee for new car purchase loans.
Italy	1.2 billion euro emergency financing support for auto industry. Trade-in allowance for new vehicle purchases of up to 1500 euros per vehicle. 46 million euro support to Fiat for new model.
UK	£2.3 billion Automotive Assistance Program, including £1 billion in government loans to support green car technology. 300 million euro loan guarantee for Opel. European Investment Bank 340 million euro loan to Jaguar Land Rover. Scrappage scheme to subsidize new vehicle purchases up to £1000 per vehicle.
Spain	Loans and loan guarantees to facilitate new model investments by Renault and Opel. Total 'soft' loans of 800 million euros for the sector. Scrappage incentive for new vehicle purchases of up to 500 euros per vehicle. Plan Vive to provide interest-free loans for new vehicle purchases.
Sweden	Government and European Investment Bank loans and loan guarantees to support purchase of Saab (by Spyker from GM) and Volvo (by Geely from Ford). Government forms new venture capital agency (Fouriertransform AB) with 3 billion kronor initial investment to support investments in auto and other high-tech firms. 25 billion kronor emergency loans to Swedish auto industry. Tax premium of up to 10,000 kronor for purchases of 'green' cars.
Portugal	200 million euro credit line for vehicle and components exporters. Scrappage incentive of up to 1500 euros per vehicle.
Russia	180 billion ruble government budget to support capital modernization in auto plants. New vehicle sales incentive introduced March 2010. US$3.5 billion loans and preferential financing to Avtovaz to preserve Tolyatti factory. New tariff on vehicle imports of 15–25% imposed to aid domestic producers in crisis.
Other Eastern Europe	Various sales tax reductions (for example Turkey) and cash scrappage incentives (for example Czech Republic, Slovak Republic) to stimulate new vehicles sales.

Table 6. *Continued*

Country	Intervention
Japan	Government investment fund (Innovation Network Corporation) established with 900 billion yen financing available to support capital investments in auto and other targeted industries. Low-interest loans to automakers from Development Bank of Japan. Sales incentive up to 250,000 yen per vehicle for trading in older vehicles; total cost 370 billion yen. Further tax incentives for purchase of environmentally advanced vehicles.
Korea	Tax cuts of up to 70% on new vehicle sales (savings up to US$2000 per vehicle). Korea Development Bank financing for new capital spending by automakers. Special Korea Development Bank loans to Daewoo (US$103 million) to facilitate new investments and recapitalization, and to Ssangyong for payment of back wages and severance. 500 billion won in R&D loans to auto industry for new-era technology and environmental improvements.
China	Sales tax cut in half (to 5%) on purchases of vehicles with small engines. Up to 6000 yuan per vehicle subsidy for purchases that result in retirement of older vehicles. Additional cash subsidies (totalling 5 billion yuan) for new vehicle purchases in rural areas.
India	Reduced excise duty on small-car purchases. State Bank of India loans to Tata to support Jaguar Land Rover operations. Large state-level subsidy to Tata to locate new factory in Gujarat.
Australia	AUS$6.2 billion programme over 10 years to support green car development, supply chain development and R&D. Tax incentives to support capital investment.

Source: Author's compilation from media reports, OECD (2009a), Sturgeon and van Biesebroeck (2009), Glassner and Galgoczi (2009) and Government Accountability Office (2009).

year—significantly more than sales declined and worse than any other major producing jurisdiction other than Russia. Production increased in China and India, almost perfectly in line with increasing sales in both countries.

We now consider in detail the policy response to the automotive crisis in North America, in light of that continent's unbalanced position in the global geography of automotive production, trade and investment. Like their European and Asian counterparts, the US and Canadian governments responded to the downturn with vehicle sales incentives and targeted industry-specific financial supports. The overall rescue effort was larger and more complex in North America, however, by virtue of the fact that two of the three North American OEMs (GM and Chrysler) sought bankruptcy protection. Initially, all three of the domestic OEMs (including Ford) had approached the US government for assistance in late 2008, as their internal liquidity evaporated in the face of plunging sales (driven doubly by a shrinking market and a shrinking share of that market). Their plea was rejected, however, amidst widespread public anger over auto industry 'fat cats' (including the union and its members) seeking a government handout.

Later in the year, with bankruptcy imminent, President Bush unilaterally announced emergency assistance for GM and Chrysler on 18 December 2008 (US Treasury, 2008). By that time, Ford executives had decided the public's opposition to the bailout (a backlash that could harm future sales) would cause more harm than good for the company. Thanks to a 2007 strategy (implemented prior to the financial crisis) to sell or leverage assets and build up a large cash reserve to finance restructuring, Ford (alone among the North American OEMs) had sufficient financial reserves to survive the downturn. So Ford broke ranks with the other companies; it did request a standby credit line of $9 billion, and it did receive close to $6 billion in federal government subsidies to finance investments in fuel-efficient technologies, but it did not join the larger bailout program that now became focused on GM and Chrysler.

GM and Chrysler had no choice but to request assistance, however, as cash reserves at both companies were exhausted by the end of 2008. Bush's December announcement provided for temporary liquidity assistance to allow both companies to keep operating for 3 months, contingent on them submitting business plans for a sustainable longer term

Table 7. *2009 change in sales and production.*

	Sales (%)	Production (%)
USA	−21.4	−34.2
Canada	−11.4	−28.4
Mexico	−27.8	−28.0
Brazil	11.9	−1.1
Germany	18.2	−13.8
France	4.3	−20.4
Italy	−2.8	−17.6
Spain	−21.2	−14.8
UK	−10.6	−33.9
Russia	−46.8	−59.7
Japan	−9.3	−31.4
Korea	19.6	−8.2
China	43.0	45.5
India	14.3	14.1

Source: Author's compilation from Ward's Automotive (2010) database.

restructuring (Government Accountability Office, 2009). Bush also announced that as a condition of the aid, both companies would be required to reduce their hourly labour costs to the same levels paid by the leading Japanese 'transplant' operations in the USA, by the end of 2009. In conjunction with Bush's announcement, the government of Canada (joined by the provincial government in Ontario, where virtually all auto manufacturing in Canada is located) announced its intention to participate with the USA in a joint rescue effort of the two firms, with Canadian participation in the rescue to reflect the relative size of the firms' Canadian operations.

From the outset, the existence of a substantial network of Japanese-owned non-union transplant manufacturing facilities in the USA and Canada shaped the nature of the North American policy response. Indeed, opposition to Bush's initial rescue package was led by representatives from the right-to-work states of the US South—the region that had benefited most from incoming Japanese FDI. They did not want the US federal government to directly assist the American-owned companies that were the main rivals of the Japanese OEMs that had invested heavily in their own states; regional loyalty, in this sense, overwhelmed whatever 'national' loyalty might have still existed towards the American-owned OEMs. Opponents of the bailout invoked these regional rivalries, as well as anti-union sentiment, to oppose the proposed rescue. This sentiment was widely shared, and the proposed rescue, the OEMs and the union were all vilified by political and media commentators, as well as by the public at large through call-in radio shows and letters to the editors of newspapers. The expansion of non-union transplant facilities, and their geographical concentration in the US South, hence provided a politically potent counterpoint to the seemingly 'bloated' and unsuccessful image conveyed by the North American OEMs. The rescue of North American OEMs could not be portrayed so readily as a matter of national interest—unlike in much of Europe (although not the UK), Japan and Korea, where the identity between domestically owned OEMs and the domestic auto manufacturing sector was perceived much more strongly. Similarly, unions were portrayed as a narrow interest group protecting only one segment of the industry, rather than the voice of workers throughout the industry.

Despite this daunting public attitude, President Barack Obama took office in January 2009 determined to push through a comprehensive rescue package for the two companies—facilitated by the changed make-up of Congress and the Senate. In late March, he declared that the initial restructuring plans submitted by both companies were unacceptable and gave them one final chance to develop more convincing business cases; he also required that still more labour cost concessions were necessary. The Canadian governments echoed Obama's view. Chrysler was given an April 30 deadline to present a new plan (and new labour agreements); GM was given until May 31. The Chrysler plan focused on entering a new partnership with Fiat (whereby Fiat would own 20% of the renewed firm, in return for sharing proprietary technology and assisting in the development of smaller vehicles for Chrysler). Both GM and Chrysler sought to facilitate their restructuring through a partial bankruptcy process (under Section 363 of Chapter 11 of the US bankruptcy code), whereby each troubled company would be split into two entities. One

entity is ascribed responsibility for debt and unwanted assets, and is eventually liquidated (imposing losses on creditors); the other entity keeps wanted assets and thus is able to carry on life as a restructured, presumably viable firm.

A second round of extraordinary labour negotiations then took place in both countries, under the full glare of public attention and political pressure (since the governments had indicated that both firms would be liquidated if new labour contracts were not attained). The resulting concessions, in theory, resulted in a reduction in all-in hourly labour costs (that is labour costs fully loaded to reflect the hourly cost of all benefits, paid time off and working hours) to broadly match estimates of all-in compensation costs in the corresponding non-union transplant facilities.[13] The US contract changes included an expansion of a two-tier wage system that had been negotiated earlier in 2007, reductions in paid time off and skilled trades wage premiums, and an end to the practice of guaranteed employment security for high-seniority union members. In Canada, the changes included reductions of paid time off, changes to several supplementary medical benefits, and productivity-boosting changes in local plant operating rules. In both countries, a large portion of the perceived 'gap' between the hourly costs of unionized and transplant facilities was closed via the creation of independent trust funds to manage the expenses associated with retiree health insurance programs. The creation of these trusts required the allocation of significant upfront funds by the OEMs into the new trusts, to offset a large portion of the liability that was now being transferred from the companies to the trusts (equivalent to about 50% of the starting estimated accounting liability in the US case and 70% in the Canadian case). So while this move resulted in a reduction in ongoing labour costs (assuming that retiree expenses are indeed a 'labour' cost), it also imposed a new upfront financing burden on the firms to endow the trust funds—and in this regard resulted in the replacement of one cost with another, rather than a full net cost reduction. In the optics-driven race to cut hourly costs to the level of the transplants, however, full credit was taken for the resulting transformation of this legacy portion of labour costs into a lump sum financial transfer.

GM and Chrysler attained new labour agreements in the US and Canada. They also negotiated agreements with other stakeholders (including some, but not all, of their lenders). With the political and financial support of the US and Canadian governments, the companies entered an accelerated bankruptcy restructuring process late in the spring of 2009, emerging some weeks later carrying much smaller debt loads and with a plan to close several more manufacturing facilities. The US and Canadian governments are major lenders to both companies and also own equity in both companies. The UAW's retiree health trusts also own significant equity shares of both companies. The total tab to government for the rescue effort equals approximately US$100 billion, with roughly four-fifths of that received by GM. The Canadian and Ontario governments provided up to one-fifth of the total funding, reflecting the Canadian share of total production in the two companies—and in return for commitments from both companies to retain that general share of their North American production in Canada.

While the labour concessions were significant, and while the labour negotiations were the highest profile element of the overall restructuring process, in practice it is not likely that the gap between union and non-union auto compensation costs was actually closed, for several reasons. First, the estimated 'non-union' benchmarks may not be fully reflective of what the transplant operations actually pay. The US government demanded that all-in UAW costs be reduced to broadly match total all-in costs at the most 'mature' transplant facilities: the longest standing Toyota and Honda plants (located in the US Midwest), that demonstrate the most generous compensation and the oldest workforce of all the US transplants. But all new transplant facilities are being built in the US South, and pay considerably lower wages and benefits than those in the Midwest. While the Midwest locations of Toyota and Honda are non-union, the more credible threat of unionization there forces them to pay notably higher wages than in their own plants in right-to-work

states. Thus, most transplants will continue to experience a significant hourly labour cost advantage compared to the US facilities of the North American OEMs. Second, the focus on hourly labour costs obscures the bottom line cost impact of the creation of the retiree health trusts; as noted, while establishing the trusts reduces apparent labour costs, they were associated with a major cash commitment (stretching over several years to come) to endow the trust funds.[14] Third, in the USA, much of the cost gap was intended to be closed thanks to the hiring of new workers by the North American OEMs at the new lower tier wage rate (which equals roughly half of wages for existing employees). However, due to the deep production cuts experienced in North America, all three companies have still been downsizing, not hiring, and hence virtually no savings have yet been realized from the UAW's two-tier system. Fourth, in both the USA and Canada, the transplant operations have reduced their own labour costs (by removing bonuses, cutting paid time off and other measures) during the current downturn—often virtually in tandem with the contract changes at GM, Chrysler and Ford. Thus, the impact of the labour concessions on the cost gap between the North American OEMs and the transplants is muted. Finally, a significant share of the 'savings' agreed to during the contract renegotiations consisted of measures (like work rule changes and shorter break time) that will boost realized productivity, not cut hourly compensation; again, this does not impact on the compensation gap between the two groups of companies. If it was true, then, that the North American OEMs were 'in trouble' because their compensation costs were higher than those paid in non-union transplant facilities, then the 'problem' has certainly not been solved.

However, deeper questions can be asked about whether that hourly compensation gap between unionized and non-union plants within the USA (and within Canada) was even relevant to the past failure and future potential success of the North American OEMs in the first place. As noted above, direct assembly labour constitutes less than one-tenth of the total operating costs of the automakers. The companies sell their output in competition against a huge range of products that originate from both very high-cost jurisdictions (like Germany) and very low-cost jurisdictions (like Mexico—where the bankrupt companies themselves have major operations). Perceived quality, design and operational features have been more important than selling price in luring customers away from North American-branded products. Lost in the public furore over compensation costs at the unionized plants is the fact that those plants demonstrate consistently higher labour productivity outcomes than the transplants; based on data from Harbour and Associates (2008), it took on average just 21.7 hours to assemble a vehicle in a UAW- or CAW-represented plant, versus 24.6 hours in the non-union plants in both countries. This productivity advantage offsets a good portion of the hourly compensation gap.

It is certainly true that shifting the financial burden associated with funding retirement health costs off the balance sheets of the companies will be a significant factor in the future viability of the North American OEMs—although that change comes with a price (namely the large cash endowments that the OEMs must pay to set up the new trusts). But the other contract changes negotiated in 2009 will not likely make any long-run, measurable difference to the total production costs of the North American OEMs.[15] Restructuring retiree health care financing could have reasonably been set as a policy goal of the overall rescue effort (recognizing the unsustainability of the former pay-as-you-go system), without any reference to an arbitrary non-union 'benchmark' (that is hourly labour costs at the non-union transplants). However, seizing on the perceived gap between union and non-union labour costs, especially given that the non-union benchmark could be defined as a *domestic* (rather than a *foreign*) variable, was a politically convenient mechanism with which to increase the pressure on the unions and indeed to assign them a large share of the blame for the failure of the North American OEMs in the first place. In this regard, the growing importance of the transplant facilities, and their continuing non-union status, centrally

shaped the automotive policy response that the US and Canadian governments adopted—and in particular its unprecedented focus on compulsory reductions in compensation costs.

In addition to the reduction in contractual labour costs, all three North American OEMs (including Ford) undertook a dramatic reduction in employment and the closure of numerous assembly and powertrain plants across the USA and Canada as the crisis wore on. By the end of 2009, the hourly workforce of the three companies in North America was half the levels of 2005. Once the bankruptcy process had run its course, and Chrysler and GM re-emerged again as 'living' companies, Ford requested the unions in both the USA and Canada to extend the negotiated savings to Ford as well.

It is interesting to note that no parallel to the government-mandated North American labour renegotiations occurred in any of the other auto-producing jurisdictions—despite the challenging economic circumstances facing the auto industry everywhere, and despite the ubiquitous role of government in rushing to support auto companies. This is not to imply that automotive labour relations did not confront immensely challenging circumstances in those other jurisdictions, to address the production downtime, lay-offs and plant closures that resulted from the crisis (Glassner and Galgoczi, 2009). Table 8 summarizes some of the major labour relations issues that were confronted by unions and auto companies in the major auto-producing jurisdictions. Unions, employers and governments in several jurisdictions were concerned with adjusting to the downturn in ways that minimized both short-term and long-term job loss. This concern motivated parties to expand the application of short-workweek arrangements, wage subsidies, work-sharing programmes and other measures to keep autoworkers on the roll through the downturn. These programs (usually government subsidized) were utilized broadly in Europe, Mexico, and Japan. In some cases (such as Germany), unions accepted temporary reductions in hourly or monthly income (usually partially offset by government subsidy) as part of the work-sharing strategy. In a few cases where the longer run viability of OEMs or particular facilities was in question, unions were approached to make permanent contract changes. This was the case for the several European unions that deal with Opel, where GM initiated negotiations aimed at reducing continent-wide employment by over 8000 positions and annual labour costs by 265 million euros, as part of its broader restructuring of the division.

Despite these challenging developments in various jurisdictions, however, in no case other than North America were labour renegotiations explicitly mandated by government as a condition for intervening in support of the auto industry. And in no other case did the public dialogue surrounding the auto industry's plight become so focused on the issue of labour costs. Indeed, official policy documents prepared in Europe, Britain and Australia hardly mentioned the issue of labour costs, and policy recommendations were focused on assisting domestic producers to become more competitive in terms of technology, productivity and environmental innovation (see Australia Department of Innovation, Industry, Science and Research, 2008; Automotive Review Secretariat, 2008; European Monitoring Centre on Change, 2004; House of Commons [UK], Business and Enterprise Committee, 2009; New Automotive Innovation and Growth Team, 2009; Paris et al., 2009).

In contrast, the North American policy discussion was uniquely oriented around the issue of labour cost comparisons and the resulting conclusion that North American labour costs should be reduced. If anything, this obsession with labour concessions could produce a misplaced optimism regarding the future viability of the North American OEMs—which, after all, have now purportedly 'solved' what was presented as the most important cause of their difficulties. In reality, as we have seen, the North American OEMs face deeper structural challenges relating to their shrinking market share at home, and the unfavourable and unbalanced place they occupy in the geography of automotive globalization. The focus by policymakers, the media and the public on extracting labour cost reductions as a centrepiece of auto industry

Table 8. *Summary of labour relations initiatives during auto industry restructuring.*

Country	Intervention
USA	Government-mandated contract renegotiation at GM and Chrysler to reduce hourly labour costs to same level as US Toyota transplants, as precondition for government aid to the companies. Parallel contract changes partially implemented at Ford. Initial implementation of two-tier labour contract at GM, Chrysler and Ford (reducing wages for new hires by 50%). Establishment of Voluntary Employee Beneficiary Association trust to take responsibility for retiree health care costs. Reduction of hourly employment at GM, Chrysler and Ford by 50% compared to 2005. Closure of 12 assembly and powertrain plants by the three North American OEMs.
Canada	Government-mandated contract renegotiation at GM and Chrysler to reduce hourly labour costs to same level as Canadian Toyota transplant, as precondition for government aid to the companies. Parallel contract changes later negotiated at Ford Canada. Establishment of health care trust to take responsibility for retiree health care costs. Reduction of hourly employment at GM, Chrysler and Ford by 50% compared to 2005. Closure of 3 assembly and powertrain plants by the three North American OEMs. Limited Employment Insurance subsidies for work-sharing plans to avoid short-term lay-offs.
Mexico	Wage protection program tied to government loans to automakers who maintain headcounts.
Germany	GM-Opel targets 265 million euros in annual cost savings and 8300 job cuts from all its European unions as part of its restructuring and recapitalization. Invocation of 'opening clauses' to defer previously agreed wage increases at several locations. Collective agreements allow reduction of workweek (to 30 or 33 hours) to prevent redundancies. Dismissal of agency and temporary workers at Volkswagen, Daimler, Ford and BMW.
France	Government support for short-work or 'partial unemployment' schemes; wages subsidized up to 95% of normal.
Italy	Continuing negotiations over Fiat desire to close Sicilian plant.
UK	Toyota and union negotiate temporary 10% wage cut and 10% hours cut to preserve jobs during downturn; plan eliminated when Toyota announced partial closure of plant and permanent job cuts. Honda and union agree to 3% temporary wage cut plus 6 new days off to prevent lay-offs. Jaguar Land Rover and union agree to 1-year pay freeze and 4-day work week.
Spain	Opel and unions negotiate restructuring agreement to assure future of Figueruelas assembly complex: pay freeze to 2011; 900 lay-offs from plant population of 7000. Nissan and unions negotiate reduction in headcounts (1680 reductions out of 4500 total) leading up to 2012.
Belgium	Opel announces closure of Antwerp factory (2600 jobs) as part of restructuring.
Russia	Weekly hours of work cut to 20 in September 2009, with weekly earnings cut by similar proportion.
Japan	Toyota fires 9000 contract workers (10% of total Japanese workforce). Nissan cuts 20,000 positions worldwide (8.5% of global workforce). Government provides 50% wage subsidies to automakers to retain headcounts under short-work time schedules.
Korea	State bank loans to bankrupt Ssangyong to pay back wages and severance costs. Union occupation of Ssangyong factory ends in agreement to permit some job cuts.

Source: Author's compilation from media reports.

restructuring probably obscured understanding in all camps of these deeper structural challenges.

Conclusion: globalization and the future of the North American OEMs

The global financial crisis and resulting recession hit the auto industry hard in all regions of the world. However, the experience in North America, where auto production and employment declined more dramatically than any other jurisdiction (except Russia), was unique in several respects. The North American-based OEMs entered the crisis in an already fragile situation, by virtue of several previous years of shrinking domestic sales and a highly asymmetrical continental dependence on incoming vehicle imports and incoming automotive FDI (both mostly from Japan and Korea). The growing importance of offshore-owned automotive facilities in the North American industry, and the geographical concentration of those facilities in the anti-union jurisdictions of the US South, undermined the notion that supporting North American OEMs should be an important goal of North American auto policy. Anti-union public attitudes, hostile labour laws and the failure of unions to gain a toehold

at the transplant facilities further contributed to the political isolation of the North American OEMs and their unions. When government support eventually came, it was delivered in a manner that took advantage of the schism between the North American-owned unionized plants and the offshore-owned non-union plants. The end result is that much public comment reflected a belief that the crisis was caused by unions and labour costs—even though international comparisons indicate that North American automotive labour costs are not especially high (relative either to other auto-producing nations or to the broader manufacturing sector).

North American governments in recent years have been generally loathe to wield the levers of proactive industrial development policies—preferring instead to rely on free trade agreements and the deregulated market to shape sectoral and geographical patterns of development (Stanford, 2008). Yet, ironically it is these same governments that ended up playing the largest and most hands-on role in rescuing the auto industry, including purchasing significant equity shares in two global OEMs. These governments remained generally passive in recent years as the North American OEMs lost domestic market share and accumulated losses.[16] But the threat of outright OEM bankruptcy (with associated spin-off consequences) at a moment of broader economic fragility motivated their belated intervention. While their actions will assure the continued survival of both companies at least for some years, the fundamental economic and geographical features that contributed to the long decline of the North American OEMs (including Ford) have not substantially changed. The unique and high-profile focus on extracting concessions from auto unions has not fundamentally altered the cost structure facing the three companies—let alone changed their capacity for better managing innovation, technology and product design (criteria that were certainly more central to their long loss of market share than labour costs). The three North American OEMs finished up 2009 holding just 43% of their home North American market (down another 3 percentage points in 2009 alone). The remainder of the continental market is divided roughly equally between inter-regional imports (mostly from Japan and Korea) and production by foreign-owned transplant facilities in North America. These OEMs thus occupy a far weaker position than competing OEMs in Europe, Japan and Korea—and even compared to the new generation of automotive OEMs developing in China and India (which likewise are leveraging success in their home markets into an evolving outward focus, heralding future potential for outbound vehicle exports and FDI from those countries as well).

If the North American OEMs can utilize their current 'breathing room' to implement more successful product and technological programmes, perhaps they will be able to defend the even smaller share of global business that they currently account for. Their own efforts (similar to those of other global OEMs) to expand presence in the rapidly growing BRIC markets may also assist the quest for corporate survival. But thinking of the North American auto industry, as distinct from North American-based OEMs, it seems very likely that the continent will continue to occupy an unfavourable position in global automotive geography, and if anything the events of the global financial crisis have weakened that position even further.

Endnotes

[1] GM and Chrysler were the only global OEMs to seek bankruptcy protection during the crisis.

[2] A 'platform' refers to the common underbody and basic architecture of a vehicle.

[3] The importance of large fixed costs in automotive manufacturing reinforces the possibility of this type of cumulative causation since reduced capacity utilization translates very quickly into higher unit costs and even larger bottom line losses.

[4] It is popular for some commentators to suggest that Japanese companies like Toyota were profitable because they more quickly addressed consumers' interests in 'greener' vehicles. This factor should not be overemphasized, however.

[5] More precisely, union security provisions (such as closed-shop or dues check-off systems) are prohibited; the result has been near-zero union penetration in private sector industries.

[6] While core wages and active benefits have been largely similar between the transplants and the unionized plants in non-right-to-work states and in Canada, total labour costs are still significantly higher in the unionized North American OEMs, partly because of expensive retiree-related costs (including unfunded pension liabilities and the cost of retiree health benefits). As noted, these costs are not significant for the transplants. Another factor pushing up total hourly labour costs in the unionized plants is the expense associated with various supplementary unemployment, job security, plant closure and restructuring costs; these programs, negotiated in earlier decades, became very expensive when North American producers began dramatically downsizing their operations.

[7] It certainly could be argued, however, that reliance on these bonus payments provides Japanese automakers with an added degree of flexibility in compensation—since the bonuses are reduced during bad years (such as 2009).

[8] The small share of direct labour in total production costs of auto assembly can initially serve to inhibit the relocation of investment in pursuit of lower labour costs. However, once the lower cost region develops an adequate supply base, that can quickly change. In fact, assuming that lower labour costs are also now enjoyed by components manufacturers, then the labour cost advantage is *amplified* by supply chain effects.

[9] These estimates of PPP exchange rates are generated by the OECD (2009b) for most of the countries in Table 5, and by the World Bank (2007) for Brazil and Taiwan.

[10] This assumes, of course, that PPP estimates themselves are an accurate measure of fair or fundamental currency values.

[11] The BLS data reported in Table 5 represent a weighted average of auto assembly and components manufacturing; consistent international data comparing labour compensation for auto assembly alone are not available. Compensation is lower in the components industry than in the auto assembly sector.

[12] In the terminology of Thomas et al. (2008), these investment supports have reflected a varying mix of strategies to support the 'comparative' and the 'competitive' advantage of respective domestic producers.

[13] Since compensation costs paid by the transplant facilities are confidential, the UAW and CAW negotiations were guided by rough estimates that pegged all-in costs at US facilities at below US$50 per hour, and all-in costs at Toyota's Canadian plant at CDN$57 per hour. In comparison, all-in labour costs for active unionized autoworkers were estimated at around $70 per hour in both the USA and Canada. The $70 starting figure differs from the data reported for Canada and the USA in Table 5 for several reasons: it reflects compensation at the OEM level only (not including components manufacturing); it includes statutory employment-related costs (such as payroll taxes) that are not included in Table 5; and it includes other expenses (such as unemployment and restructuring benefits) associated with time not worked (see Stanford, 2009).

[14] The GM trusts will require US$22 billion of funding from GM in the USA and CDN$1.8 billion in Canada. The Chrysler funds will require US$6 billion in the USA and CDN$1.1 billion in Canada.

[15] Excluding the 'savings' attained by shifting retirement health costs to the new trust funds, the 2009 negotiations reduced active hourly labour costs by around 10% in both countries. A 10% reduction in a cost component that constitutes less than 10% of total production costs implies a reduction in total costs of less than 1%.

[16] North American governments had introduced a range of interventions to support the North American OEMs during earlier periods of poor performance (such as the 1970s and 1980s). The long decline in the domestic market share of the North American OEMs which began in 1996, however, did not elicit active government response until the financial crisis hit in 2009 and the OEMs faced bankruptcy.

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