Regional Long Waves of Economic Development: Trends in the Washington Economy

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EXECUTIVE SUMMARY

Like national and world economies, a regional economy goes through long waves of economic activity. Specifically, a region will experience a relatively lengthy period of economic growth close to or above the national rate followed by a relatively lengthy period of economic growth below the national rate. This research applies a regional long wave theory of economic development to the Washington State economy to explain recent changes in its structure and rate of growth and to predict its probably future course. It addresses these key questions:

- Is the Washington State economy nearing the end of the rapid growth phase of a long wave, or will the current wave of relatively rapid growth that began in the 1950s continue?

- Will the industries and sectors of the state economy that have been growth leaders since the 1940s continue in that role or will new growth leaders be needed to sustain growth?

- Is there any evidence of emerging new industries and sectors in the state economy that can take up the mantle of growth?

- How widely have the benefits of growth been distributed throughout the state?

- Are there sub-regions within the state that are experiencing slow growth or stagnation because they continue to depend on resource-based industries that led the first wave of economic growth but are now maturing and experiencing declining employment?

A central conclusion is that the Washington State economy has historically gone through one complete long wave and is currently in the growth phase of a second long wave. From the latter part of the nineteenth century to the 1920s, the Washington State economy experienced relatively rapid growth based primarily on wood products and food processing. After a period of stagnation lasting from the 1920s to the early 1950s, the growth phase of a second long wave began.

This long wave was initially fostered by expansion of the aircraft industry and has been fed more recently by rapid expansion in certain manufacturing industries such as plastics, computers, electronics, and instruments. Certain service industries such as finance, business services, legal services, and engineering and research services have also contributed to growth in the latter part of this period.

While modest employment gains can be expected in the aircraft industry in the near future, the prospect for future expansion in other high growth industries does not appear to be substantial enough to keep the Washington State economy growing at a more rapid rate than the national economy for many more years. Washington's rate of new business formation is relatively low by national standards, suggesting that new growth leading industries based on new business are unlikely to emerge in the near future. The state appears to be approaching the end of the rapid growth phase of a long wave.

The benefits of the current long wave have been largely confined to the Puget Sound area. The coastal, timber producing counties have suffered economic stagnation and the agricultural counties of eastern Washington have experienced growth below the state average. These latter two regions continue to depend heavily on resource-based industries that fostered the state's first long wave growth phase and are now experiencing slow growth or decline.

To forestall stagnant growth, economic policy should be directed towards stimulating the creation of new businesses that can serve as the foundation for new high growth industries. Since most research has shown that tax breaks for businesses are ineffective in fostering new business formation, some states are now experimenting with venture capital funds and technical assistance agencies to help create not only new privately-owned businesses, but also new producer cooperatives and worker-owned enterprises.

I. REGIONAL LONG WAVES

Long waves of economic activity at national and international levels having a duration of anywhere from forty to sixty years can be traced to waves of innovation that result in the creation of new high-growth industries. These industries in turn go through a life-cycle of development characterized initially by rapid growth and eventually by retardation of growth that can be traced primarily to market saturation. Similarly, regional long waves can be explained by industrial life-cycles and the creation of new high-growth industries.

New industries usually emerge in regions of the country not already dominated by other relatively mature industries or in regions of the country that have suffered poor economic growth for an extensive period of time because of the economic decline of older industries. The resurgence of the New England economy on the basis of new industries in recent years would be an example of the latter, while the growth in the Southeastern and Southwestern U.S. since World War II would be an example of the former.

A given regional long wave is determined fundamentally by the life-cycles of the industries that emerge at its beginning. A set of high-growth industries is developed in a given region, the region experiences relatively rapid growth during the initial high-growth phase of the life-cycles of these industries, and the region experiences retardation of growth as these industries face the problem of market saturation or rising competition from low-cost producers located elsewhere.

Even though such industries may not experience an absolute decline in output as markets become saturated, they are likely to reduce their employment levels. As an industry matures and its technology stabilizes, competition will intensify as producers emerge in other regions or countries with lower wages. To remain competitive, the industry will invest in labor saving technology or move its production facilities to locations with lower wages. In either case, the result will be reduced local employment.

In order for regional long wave theory to be logically complete, an explanation of why new industries do not emerge in regions with established industries is needed. If in fact a new set of growth industries emerged alongside the old set of growth industries before declining employment was experienced in the latter, a decline in regional employment growth would not necessarily occur as the older industries experienced market saturation. The new set of growth industries would simply take up the mantle of growth from the old.

The fundamental problem is that in regions with established industries individuals who would otherwise start new businesses that could serve as the basis for new industries will be attracted to the easy life of managerial or professional positions offered by the old industries.[1] Consequently, the rate of new business formation will be relatively low, reducing the likelihood that a pioneering entrepreneur with a major basic innovation will emerge to provide the foundation stone for the creation of a new high-growth industry. However, once employment decline occurs in established industries, new business formation will accelerate as managerial and professional employment opportunities diminish in the region. Those with entrepreneurial abilities who desire to remain in the region will have little choice but to start new business ventures in order to earn a decent living.

The resulting acceleration in new business formation will set the stage for the creation of new industries and a regional economic recovery. The period of new industry incubation can be lengthy, however, and a region will suffer poor economic growth and above average unemployment for a substantial period of time before recovery takes place (Booth, 448-460).

II. THE REGIONAL LONG WAVE AND THE WASHINGTON STATE ECONOMY

While there is preliminary evidence that regional long waves have been experienced in the eastern and mid-western regions of the U.S., the question has not been addressed for the Pacific Northwest and, more specifically, for Washington State. The first step in determining whether Washington has been subject to a long wave growth pattern is to consider the employment growth history of the state relative to the U.S. as a whole.

As can be seen in Table 1, manufacturing employment in the state grew much more rapidly than in the country as a whole from 1879 to 1919. However, from 1919 to 1951, the manufacturing employment growth rate for the state was less than for the country as a whole. Between 1951 and 1968, a long wave recovery took place, and the growth rate for manufacturing employment in the state significantly exceeded that of the U.S. With the exception of a setback in the 1968-73 period, this pattern has persisted up to 1984, the latest period for which data is available. The sharp reduction in manufacturing employment in the 1968 to 1973 period can be attributed entirely to a decline of employment in the aircraft industry.

Table 1
Private Sector Employment in Washington State: 1879-1984

Year	**1879**	**1889**	**1899**	**1909**	**1919**	**1929**	**1939**
Manufacturing							
Wa.	1063	17371	32400	72700	135600	128740	108834
% change		1534.1	86.5	124.5	86.5	-5.1	-15.5
Wa. —U.S. % change		1462.1	53.9	101.6	45.7	-.7	-8.3

Year	**1951**	**1968**	**1973**	**1979**	**1984**
Manufacturing					
Wa.	180345	280412	235138	305876	278896
% change	65.7	55.5	-16.1	30.1	-8.8
Wa.—U.S. % change	-3.2	33.2	-16.3	21.4	1.2
Services					
Wa.	56081	148187	180072	285599	343568
% change		164.2	21.5	58.6	20.3
Wa.—U.S. % change		-7.4	-2.8	16.8	-1.0
Total					
Wa.	518442	834312	860619	1252737	1294510
% change		60.9	3.2	45.6	3.3
Wa.—U.S. % change		17.3	-9.3	23.7	-1.1

Sources: Tattersall, 231-234; U.S. Bureau of the Census, 1929, 1939, 1951, 1968, 1973, 1979, 1984.

The Washington State economy thus appears to have gone through two long waves, rapid growth phases and one long wave, stagnation phase in the manufacturing sector. The first long wave growth phase began in 1879 and had come to a halt by 1919. The state economy then entered a period of relatively slow growth that lasted through the 1920s, a boom period for the country as a whole, the Great Depression, and World War II. While manufacturing employment recovered during the war, its growth did not match that of the U.S. as a whole. The second long wave growth phase in manufacturing began after the war and has continued up to the present day. With the exception of the 1968-1973 period, commonly referred to as the "Boeing bust," growth in manufacturing employment in Washington has consistently outperformed growth in U.S. manufacturing employment, even during the 1979-84 period when Washington employment declined more slowly than U.S. employment.

Traditionally, the focus of attention in regional economic development has been on the manufacturing sector. This approach was a reasonable one historically since prior to World War II the principal generator of basic sector jobs was the manufacturing sector. Basic sector jobs are those in a region's export sector while non-basic jobs are those that serve the needs of the local population. Employment growth occurs as the result of growth in basic sector jobs or as the result of substituting locally-produced goods or services for goods or services previously imported into the region. In both instances, additional income flows into the region provide the foundation for employment growth. The addition of an export oriented manufacturing job leads to the creation of additional jobs to meet added demand for locally-produced goods.

Since regional long wave theory is concerned with the export sector, the remainder of this study will focus on the creation of basic sector jobs. There is increasing evidence that in recent years services are being exported from regions as well as manufactured goods (Beyers, et al.). Consequently, the performance of the services sector should be considered in regional long wave analysis as well as manufacturing. As can be seen from Table 1, the growth rate of services employment up to 1973 in the state was less than that of the U.S. In the latter two thirds of the 1970s, however, a surge in services employment growth has pushed Washington's services growth rate well above that of the U.S. Up to 1973, manufacturing appears to be the driving force in the state economy, and after that services as well as manufacturing appear to be important determinants of economic growth.

III. ENGINES OF GROWTH IN THE WASHINGTON STATE ECONOMY

The key industry leading the first wave of growth in the state from 1879 to 1919 was the lumber industry which experienced its period of most rapid growth in the 1880s and in the first decade of the 1900s (Table 2). After that, its growth rate slowed considerably. The next most important industry in the state in this period was food processing. It experienced its most rapid growth in the latter part of the 1800s and the first two decades of the 1900s, and experienced a marked slowdown in growth in the 1920s. Stagnation in wood products and food processing was partially offset by the growth of the pulp and paper industry in the 1920s and 1930s. The shipbuilding industry played a modest role in the economy of this period except for the massive amount of shipbuilding employment associated with Word War I.[2] By the end of the period transportation equipment employment was increasing, reflecting the emergence of Boeing and the aircraft industry as a major force in the local economy. In sum, the first wave of rapid growth in the Washington State economy was based on natural resource processing industries, and stagnation in aggregate manufacturing employment growth occurred at the same time as those industries experienced a retardation of growth in employment. The negative aggregate employment growth figure for the 1920s, however, can be traced primarily to the dramatic drop in shipyard employment after World War I. The decline of employment in the 1930s resulted largely from the drop of employment in the lumber and wood products industry.

The first step in selecting industries and sectors that have been the driving force in the regional economy since 1951 when the growth phase of the second long wave began is to consider the performance of those sectors having significant export base potential, including manufacturing, utilities and transportation, finance, real estate, and insurance, and services as defined in the Census of Business. As can be seen in Table 3, all of these sectors had growth rates in the state that were above comparable figures for the U.S. as a whole between 1951 and 1984. In terms of a relative growth rate calculated by subtracting the U.S. growth rate from the state growth rate, finance, real estate, and insurance does the best while manufacturing comes in second. The relative growth rate for services is positive only because of the surge in services employment growth since 1973, and the relative growth rate for transportation and utilities is the lowest of the group.

Another way of looking at the same data is to consider the change in employment shares that occurred in the state economy from 1951 to 1984 (Table 4). The share of employment in manufacturing and transportation and utilities clearly declined over the period in the state, while the share in finance, insurance, and real estate and services increased significantly.

Table 2

Manufacturing Employment in Washington State: 1879-1939

Year	1879	1889	1899	1909	1919	1929	1939
Industry							
Total All Industries	1063	17371	32400	72700	135600	128740	108834
Food & Kindred Products	79	1127	4300	8300	14000	14427	17670
Text Mill Products	11	24	100	200	300	113	110
Apparel	30			400	1300	2712	1753
Lumber & Wood Products	625	10979	21400	46700	59400	65663	48260
Furniture & Fixtures	41	159	200	600	900	1818	1868
Pulp, Paper Products				100	2100	5653	8658
Printing & Publishing	16	987	1300	4100	4200	5379	4096
Chemicals	2	25	100	100	300	385	652
Petrol & Coal Products					100	789	110
Rubber Products						34	43
Stone, Clay, & Glass	43	2167	600	2600	1800	1788	1256
Primary Metals	24	316	200	800	2600	2801	3185
Foundry & Machine Products	33	557	1200	2800	5100	4563	2639
Electrical Machinery					300	426	186
Transportation Equipment	74	311	100	1100	36700	1872	6993

Sources: Tattersall, 231-234; U.S. Bureau of the Census, 1929, 1939.

Table 3

The Structure of the Private Sector Economy in Washington State: 1951-1984

Sector	Employment 1951	Employment 1984	% Change Employment Wa.	% Change Employment WA.—U.S.
Agric., For., Fish	3173	11140	251.1	54.3
Mining	2863	2990	4.4	-3.4
Construction	43306	73921	70.7	-6.2
Manufacturing	180345	278896	54.7	34.9
Transportation, Utilities	43019	81522	89.5	14.4
Wholesale Trade	46810	93372	99.4	4.8
Retail Trade	110323	294849	167.3	46.0
Finance, Ins., Real	26822	98063	265.6	61.1
Services	56081	343568	512.6	32.0
TOTAL	**518442**	**1294510**	**149.7**	**44.0**

Sources: U.S. Bureau of the Census, 1951, 1984.

Table 4

Changing Employment Shares in the Washington Sate and U.S. Economies: 1951-1984

Sector	Share 1951	Share 1984	% Change Wa.	% Change U.S.
Agric., For., Fish	.6	.9	50.0	100.0
Mining	.6	.2	-66.7	-50.0
Construction	8.3	5.7	-31.3	-14.5
Manufacturing	34.8	21.5	-38.2	-41.6
Transportation, Utilities	8.3	6.2	-25.3	-14.3
Wholesale Trade	9.0	7.2	-20.0	-5.5
Retail Trade	21.3	22.8	7.0	7.3
Finance, Ins., Real	5.2	7.6	46.2	48.0
Services	10.8	26.5	145.4	183.7

Sources: U.S. Bureau of the Census, 1951, 1984.

However, manufacturing in the state decreased its employment share at a slower rate than the U.S., transportation and utilities decreased it employment share at a faster rate than the U.S., and finance, insurance, and real estate and services increased their shares at a slower rate than the U.S.

Relative to the U.S. as a whole, the state economy became more manufacturing oriented, suggesting that manufacturing was the driving force in adding export base jobs to the regional economy. This does not preclude the likelihood that significant numbers of export base jobs were added in sectors other than manufacturing. There is evidence that this was indeed the case. For example, a recent study found that a large subset of firms engaging in export activity in transportation and utilities, finance, insurance, and real estate, and services increased the amount of business they did outside the region from 46 percent to 55 percent between 1979 and 1984 (Beyers, et al., viii). Input-output studies for the state also indicate that an increasing share of output is going to exports in these sectors (Bourque and Conway, 1976; Bourque, 1986). However, the positive effect of this export expansion on employment could have been offset to some extent by increased imports in these sectors.

The central point is that even though the regional economy is increasingly becoming services oriented, the role of manufacturing as a generator of export base jobs cannot be discounted. Both service-oriented sectors and the manufacturing sector must be carefully analyzed to identify key rapid growth business activities that serve as long wave engines of economic growth. The first step will be to identify rapid growth industries in the manufacturing sector, and the second step will be to do the same for the services sector.

As can be seen in Table 5, there has been a dramatic change in the industries responsible for manufacturing employment growth since the first long wave. Lumber yields to transportation equipment as the largest industry in the state. From 1951 to 1968, the aircraft industry, a subcategory of transportation equipment, adds approximately 75,000 jobs to the economy while employment in lumber declines over the period. The growth of the aircraft industry is, of course, the result of the growth and development of the Boeing Company.

Table 5

Manufacturing Employment in Washington State: 1951-1984

Industry	SIC	1951	Share	1968	Share	1973	Share	1979	Share	1984	Share
Food	20	21445	11.9	25145	9.0	24056	10.3	28730	9.4	27265	9.8
Textiles	22	687	.4	668	.2	720	.3	1214	.4	1203	.4
Apparel	23	3579	.2	5445	1.9	6566	2.8	7426	2.4	5238	1.9
Lumber	24	55304	30.7	42797	15.3	46113	19.6	50545	16.5	37721	13.5
Furniture	25	3102	1.7	3186	1.1	3328	1.4	3440	1.1	3512	1.3
Pulp,Pap	26	14318	7.9	17753	6.3	16986	7.2	13992	4.6	15284	5.5
Printing	27	7270	4.0	10845	3.9	11858	5.0	15036	4.9	16932	6.1
Chemicals	28	10466	5.8	6526	2.3	5882	2.5	7797	2.5	9634	3.5
Petroleum	29	171	.1	1449	.5	1277	.5	2859	.9	2543	.9
Rub.,Plas.	30			1022	.4	1551	.7	5151	1.7	4535	1.6
Plastics	307			865	.3	1252	.5	4741	1.5	4125	1.5
Glass	32	4073	2.3	5978	2.1	5538	2.4	6930	2.3	5996	2.2
Prim.Met.	33	11298	6.3	12673	4.5	14235	6.1	17655	5.8	14149	5.1
Fab.Met.	34	6132	3.4	8140	2.9	6948	3.0	12549	4.1	10224	3.7
Machinery	35	5380	2.9	10758	3.8	10875	4.6	18488	6.0	18011	6.5
Computer	357			252	.1	234	.1	2228	.7	6124	2.2
Electric	36	1015	.6	5533	2.0	7913	3.4	8032	2.6	13083	4.7
Commun.	366	60		2576	.9	3681	1.6	3654	1.2	2604	.9
Comp.	367			382	.1	80	.3	1084	.4	6065	2.2
Trans.Eq.	37	32324	17.9	114590	40.9	58958	25.1	86425	28.3	66060	23.7
Aircraft	372	25841	14.3	101610	36.2	(D)		64049	20.9	51268	18.4
Ships	373	3549	2.0	8840	3.2	8035	3.4	15835	5.2	11654	4.2
Instrum.	38	248	.1	687	.2	837	.3	4620	1.5	8118	2.9
Total		**180345**		**280412**		**235138**		**305876**		**278896**	

Sources: U.S. Bureau of the Census, 1951, 1968, 1973, 1979, 1984.

Note: A (D) indicates that data are unavailable because of requirements to avoid disclosures of information for individual companies.

Boeing has its historical roots in the growth retardation phase of Washington State's first long wave. The founder of the company, William E. Boeing, moved to the state in 1903 where he invested in timberland and later a small shipyard (Hardy, 6). Boeing became interested in aviation during World War I and went into a partnership with Conrad Westervelt to build a seaplane. Boeing was relatively wealthy as a result of an inheritance and the success of his investments in timber.

The timber business was not dynamic enough to hold his attention full-time, and he was attracted by the excitement of flying and the newly emergent aviation industry (Mansfield, 5-15). In the 1920s and 1930s, the Boeing Company built successively larger and more sophisticated aircraft, primarily for the military.

The Boeing Company's success as an aircraft manufacturer was cemented by its rapid growth during World War II as a military contractor and after the war by its move into commercial aviation. Its history suggests that the incubation period required before a new enterprise becomes a major force in a regional economy by creating a major new industry can be lengthy, in Boeing's case 20 years. The timing of the founding of Boeing also supports the notion that individuals capable of running enterprises will begin to be attracted to new industries when opportunities in the old begin to fade. Again, the key problem is the length of the incubation period before any of the new ventures grow to become large enterprises in the local economy.

From 1951 to 1968, the aircraft industry was by far the single most important source of manufacturing employment growth (Table 5). Aircraft employment dropped dramatically during the "Boeing bust" and has never regained its 1968 peak level. Whether it ever will is an open question, but the contribution of the industry to aggregate employment growth since the beginning of the "Boeing bust" has been negative.

Other industries have taken up the slack and made major contributions to employment growth since 1968. These include printing, chemicals, rubber and plastic products, machinery, electrical goods, and instruments. The chemical industry grew significantly between 1968 and 1984, but it did not make up for employment lost between 1951 and 1968. The chemical industry in this state is dominated by employment at the Hanford nuclear facilities.

The printing industry serves a local market, primarily newspapers, and thus is not a generator of export base employment. The rubber and plastic products industry has grown since 1968 because of growth in plastic goods manufacturing, an industry that has come into existence only since World War II.[3] Similarly, the growth of the machinery and electrical goods industries can be traced respectively to new product lines, computers and related electronic components. The instruments industry is also a relatively new rapidly growing sector of the economy.

In short, manufacturing employment in the Washington State economy has been propped up to an important extent by the emergence of new high-growth industries since the mid-1970s. From 1973 to 1984, plastics, computers, electronic components, and instruments added 21,300 jobs to the economy. In contrast, the mature industries that led the first wave of growth in Washington State had a negative impact on manufacturing employment in recent years. Food, lumber, and paper lost 10,797 jobs between 1951 and 1984.

Employment in food processing increased slightly, but its share in total employment dropped. The same is true for the pulp and paper industry, and the lumber industry lost a substantial amount of employment according to the data presented in Table 5. In the case of two other key industries, primary metals gained employment but lost employment share, and fabricated metals gained both employment and employment share between 1951 and 1984. However, both of these industries have lost employment since 1979. Primary metals is dominated by the aluminum industry that grew to prominence in the state as a result of hydroelectric power expansion beginning in the 1930s. Shipbuilding, a relatively mature industry subject to the whims of government contracting and shipping regulations, grew significantly from 1951 to 1979, but has since been on hard times. While mature industries will remain a significant force in the economy, their employment levels are likely to diminish in the future. In the case of lumber, this will be true even if the magnitude of timber cutting does not diminish. Between 1977 and 1984 softwood lumber production in the U.S. was flat, but employment declined by 25 percent as a consequence of automation (Bayless). In general, mature industries face stable or declining product demand and are reducing employment levels through improvements in technology.

As the data in Table 3 indicates, the services sector is by far the largest generator of new jobs in the Washington State as well as the national economy. At the regional level, many of these added jobs can be traced to the relative shift towards services in the economy as a whole, but some are the result of the increased export of services that brings forth increased income flows into the economy. The real problem in looking at statistics on services is that there is no concrete way of even roughly separating out categories that are exported services. We know that most Boeing 747s get exported from the local economy, but we don't know what portion of business services are exported. A recent study on the services sector, however, does provide some information on services exports (Beyers, et al.). Also, it is useful to identify those industries in the services sector that are in fact growing rapidly. If rapid growth industries are also industries in which exports are significant, then we can feel reasonably secure that such industries in the services sector are in fact independent generators of employment growth.

Employment data for key services industries are presented in Table 6. Those industries with significant increases in employment share are the growth leaders in services and include business services, health services, legal services, education services, and the miscellaneous services category which includes engineering and architectural services. A study of the services sector covering the central Puget Sound region found significant levels of export activity in business, legal, and miscellaneous services (Beyers, et al., 46). Within the business services category, a significant level of export activity was found in computer programming and services and miscellaneous business services which includes research and development laboratories and management and public relations services. Since these selected categories of services are experiencing both rapid growth and significant export activity, they are likely contributors to the region's export base. In short, these services industries have been important engines of regional growth in recent years.

The services study did not find a significant amount of health services export activity (Beyers, et al., 46). Although employment growth in health services has been substantial, it can probably be explained primarily by increasing local demand for such services rather than increasing export demand.

The services study also found a significant amount of export activity in transportation, communications, and utilities and finance, insurance, and real estate (Beyers, et al., 46). The latter sector has been subject to rapid growth while the former has not. A portion of export activities in transportation and finance are associated with shipping through Puget Sound ports (Port of Seattle).

In sum, the long wave growth phase in the Washington State economy beginning in the 1950s has been led by a combination of relatively high growth industries in manufacturing, finance, real estate, and insurance, and services. The growth in manufacturing was particularly robust up to the 1970s and the growth in services was especially strong from 1973 to 1979.

Table 6

Services Sector Employment in Washington State: 1951-1984

Industry	SIC	1951	Share	1968	Share	1973	Share	1979	Share	1984	Share
Hotels	70	7220	12.9	10431	7.0	11757	6.5	16536	5.8	16891	4.9
Personal	72	10722	19.1	13396	9.0	12913	7.2	15896	5.6	18805	5.5
Business	73	5561	9.9	18202	12.3	21300	11.8	48514	17.0	53078	15.5
Build.	734			3819	2.6	4508	2.5	6917	2.4	6489	1.9
Comp.P.	7372	1191	2.1					7407	2.6	5956	1.7
Softwa.	7372							455	.2	1988	.6
Misc.	739			10799	7.3	13099	7.3	19257	6.7	22960	6.7
Auto Rep	75	2451	4.4	6121	4.1	6871	3.8	10621	3.7	10889	3.2
Misc Rep	76	1486	2.6	3046	2.0	369.	2.1	5581	2.0	5427	1.6
Mot Pic	78	3024	5.4	2496	1.7	2333	1.2	2496	.9	2587	.8
Amusem.	79	5239	9.3	8050	5.4	8974	5.0	13212	4.6	16025	4.7
Health	80	8743	15.6	46545	31.4	60531	33.6	91956	32.2	112940	32.9
Legal	81	1380	2.5	2937	2.0	4243	2.4	8078	2.8	12434	3.6
Educ	82	67.	1.2	7166	4.7	10127	5.6	12095	4.2	18041	5.2
Mem. Org.	86	7332	13.1	18064	12.2	22196	12.3	21159	7.4	28286	8.2
Misc.	89	1359	2.4	11272	7.6	14535	8.1	18377	6.4	19813	5.8
Total		**56081**		**148187**		**180072**		**285599**		**343568**	

Sources: U.S. Bureau of the Census, 1951, 1968, 1973, 1979, 1984.3

IV. THE FUTURE OF THE LONG WAVE

What is likely to be the future course of the current long wave in the Washington State economy? This is an extremely important and difficult question to answer. The answer to this question hinges on whether the Boeing Company, a major force in the state's manufacturing sector, will experience a resurgence in local employment, whether new high growth manufacturing and services sector businesses emerging in the 1970s will continue their rapid growth in the future, and whether new business formation will lead to the creation of still newer high growth industries and sectors. The data on employment growth presented in Table 1 hints at the possibility that the long wave growth phase for the state may be coming to an end. Between 1979 and 1984 the rate of growth in services and total employment for the state was below the U.S. rate, and the rate of growth in manufacturing employment was only modestly above that for the U.S. On the other hand, this data could simply be the result of the 1982-83 recession.

One simple approach for gaining some insight into the future course of the long wave is to look at recent growth trends for the high growth sectors identified in the analysis above. Annual growth rates for the high growth industries in the state are presented in Table 7. The beginning and endpoints for the periods selected are years in the expansion phase of the business cycle and are therefore roughly comparable in terms of their position in the business cycle. The only exception is the year 1984 that marks the beginning of recovery after a sharp recession. The following year would be preferred, but data for that year is not yet available from the Census Bureau.[4] Between 1973 and 1979 plastic goods, computers, and instruments experience an acceleration in employment growth in manufacturing along with employment in finance, insurance, and real estate, and business services. All the high growth categories experience a retardation of growth in the 1979 to 1984 period with the exception of electronic components in manufacturing. The general slowdown in economic growth in the 1979-84 period probably can be attributed to the 1982-83 recession. Industries that have experienced an acceleration of growth since 1973 could continue to experience growth in the future and continue to be engines of growth in the long wave process.

Because the Boeing Company is such a dominant force in the Washington State economy, predicting its future is a central issue in determining the future course of economic growth in the state. Boeing still directly and indirectly provides about one-fourth of the jobs in the central Puget Sound economy according to a recent study, a figure that has changed little since 1960. Puget Sound area employment at Boeing facilities has increased from 57,800 in 1983 to 81,000 in 1986 because of growth in orders for commercial aircraft and more defense contracts (Gapay).

Because of the order backlog, analysts are predicting relatively stable employment at Boeing in the immediate future. Because of increasing competition from Airbus and McDonnell Douglas and potential future competition from the Japanese, the long term prospects for employment at Boeing are less clear (Ibid.; Lane). Future competition will likely erode Boeing's dominant position in the world commercial aircraft market and it will increasingly behave like a mature industry. At this point, employment prospects in the Washington state aircraft industry will likely begin to diminish.

Future growth prospects in the Washington state economy depend not only on the aircraft industry, but on other relatively new industries such as electronics, including computers, and computer software. Total state employment in these industries grew 3.7 percent in 1985 to approximately 28,000 (Hayes).

The future prospects for electronics assembly in the state, however, is not very bright. Most jobs in this industry pay in the five to six dollar an hour range, require limited skills, and compete directly with workers who are paid at much lower rates overseas. Consequently, employment in this sector will probably diminish in the future (Nelson).

On the other hand, growth prospects in the computer software industry are excellent with sales rising at an 18 percent annual rate. Much of this sales growth will be captured by the leading three firms in the industry, including Microsoft of Redmond, Washington, rather than existing smaller firms and new startups (Wessel). This suggests that the entrepreneurial phase of the industry is coming to a close and that little growth can be expected from startups in Washington and elsewhere.

Will new industries and categories of business activity likely emerge in the near future in Washington to take over as growth leaders if the older growth leaders falter? Since new industries and major business sectors are created by new enterprises, the rate of new business formation is an important determinant of the emergence of new engines of economic growth. Of the many businesses that are formed each year, only a few survive and prosper to such an extent as to become a major force in the economy. A higher rate of new business formation will likely increase the number of those firms that do grow to become major employers in the economy.

Table 7
Compound Annual Growth Rates for High Growth Industries in Washington State (Percentages)

Industry	SIC	1951-68	1968-73	1973-79	1979-84
Plastics	307		7.7	24.9	-2.7
Computers	357		-1.5	45.7	22.4
Communication Equipment	366	24.8	7.4	-.1	-6.6
Electrical Comp	367		21.8	5.0	41.1
Transportation Equipment	37	7.8	-12.5	6.6	-5.2
Aircraft	372	8.4			-4.4
Instruments	38	6.2	4.0	33.0	11.9
Finance, Insurance, Real Estate		4.0	3.5	6.5	1.8
Business Services	73	7.2	3.2	14.7	1.8
Miscellaneous Services	89	13.3	5.2	4.0	1.5
Total Employment		**2.8%**	**.6%**	**6.5%**	**.7%**

Sources: U.S. Bureau of the Census, 1951, 1968, 1973, 1979, 1984.

One measure of the rate of new business formations is the rate of new incorporations each year. Data on new incorporations per thousand population for Washington and the U.S. are presented in Table 8. From 1950 up to the mid-1970s the rate for Washington was substantially below that of the U.S. economy as a whole. This could be the result of the state economy being strongly influenced by a single large employer, the Boeing Company, that was growing rapidly for most of the period. Individuals with the ability to start of new enterprises could instead obtain secure, lucrative employment as professionals or managers in the rapidly growing aircraft industry. This would likely depress the rate new business formation in the state economy. The rate of new incorporations in the state relative to the U.S. as a whole did increase significantly in the latter half of the 1970s after the "Boeing bust." This could be explained by a decline of employment opportunities for professionals and managers. New incorporations are also stimulated by new business formations associated with population growth (Booth, 456). There was a surge of population growth in the late 1970s, but the surge of new incorporations that brought the rate in the state up near the national figure appears to have preceded the bulge in population growth that began in about 1978 (Washington, 1986, 28). Unfortunately, the rate of new incorporations in Washington as a percent of the national new incorporation rate fell in the early 1980s to the subnormal levels that prevailed in the 1960s and early 1970s.

The experience of the New England and middle Atlantic states suggests that new business formation accelerates above national averages only when the regional long wave is in the growth retardation phase, and that new businesses become significant forces in the economy by creating new industries only after a relatively long incubation period. These states as a group have experienced a new incorporation rate well above the national average since 1950, and are only just now experiencing a recovery in economic growth. By contrast, the Midwest has seen its employment growth rate drop farther and farther below that of the U.S. as a whole in recent years and at the same time has experienced a relatively low rate of new incorporations. Its new business formation rate has not yet begun to accelerate as a consequence of economic decline and diminishing opportunities in existing businesses and industries (Booth, 1986). This suggests that the Washington State economy is not likely to see a permanent upward shift in new business formations relative to the economy as a whole until it falls on hard times, and that new business formations are not likely to be a major stimulus to regional economic growth in the near future. The future course of the regional economy will thus depend to a large extent on what happens to businesses that are already well established and have played a significant role in the growth of the region in the recent past. This is a clear sign that the Washington State economy is approaching the end of the rapid growth phase of its current long wave of economic development.

Table 8

New Incorporations Per Thousand Population in Washington State: 1950-1984

Year	Washington	Washington/U.S. %	
1950	.585	98.5	
1951	.387	73.9	
1952	.408	71.5	
1953	.497	79.9	
1954	.700	84.9	
1955	.736	89.9	
1956	.600	73.6	
1957	.566	73.0	Average: Wash./U.S. %
1958	.699	83.3	
1959	.975	92.2	1950-69: 83.7
1960	.840	85.6	1970-75: 89.4
1961	.828	86.6	1976-80: 98.2
1962	.814	86.0	1981-84: 87.3
1963	.772	80.9	
1964	.753	75.6	
1965	.812	80.6	
1966	.812	82.7	
1967	.869	86.8	
1968	1.052	94.9	
1969	1.183	92.7	
1970	1.085	87.9	
1971	1.226	92.5	
1972	1.248	86.6	
1973	1.316	88.2	
1974	1.292	91.1	
1975	1.293	89.9	
1976	1.576	96.2	
1977	1.969	104.5	
1978	1.985	98.4	
1979	2.237	100.9	
1980	2.025	91.1	
1981	2.234	93.3	
1982	2.034	87.8	
1983	2.057	84.4	
1984	2.137	83.7	

Sources: Dunn and Bradstreet; Washington, 27; U.S. Bureau of the Census, 1951-1985.

Note: The average annual new incorporation rate for the eastern states (New England and Middle Atlantic), mid-western states, Washington State for the period 1977-1983 were respectively 2.033, 1.424, and 1.703.

V. LONG WAVES AND A DUAL ECONOMY

The analysis thus far suggests that the aggregate economy of the state has done relatively well in comparison to the national economy since World War II. This statement, however, tells us nothing about how different geographical areas of the state have fared in recent years. Some areas of the state experienced relatively high growth rates because they managed to capture the high growth industries, while other areas were saddled with low growth rates because they were stuck with slow growing mature industries. A high aggregate growth rate in a region does not necessarily mean that all sub-regions will necessarily experience rapid growth.

How equitably has the overall growth of the Washington economy been spread throughout the state? This question can be answered by looking at the sub-regional growth trends within the state. In Table 9, the state is divided into economic sub-regions according to economic specialization and relationship to an urban center. The coastal counties include Clallam, Jefferson, Grays Harbor, Mason, Pacific, Wahkiakum, Lewis, Cowlitz, and Skamania. These counties form a continuous region that specializes heavily in forest products. Clark County is separated out because of its urban status and close connection to the Portland metropolitan area. The East Sound region includes Thurston, Kitsap, and Island counties, all of which are heavily dependent on governmental activities as an employment base. The North sound region includes San Juan, Whatcom, and Skagit counties, which as a group form a distinct geographical area, although each has certain unique features in its economic base. The West Sound region includes Snohomish, King, and Pierce County, a large, relatively contiguous urban region. In eastern Washington, Yakima, Benton and Franklin, Walla Walla, and Spokane counties are each treated as separate units because they each contain significant urban centers. The remainder of the eastern Washington counties are lumped together because of their rural character and their high dependency on agriculture.

Table 9
Relative Employment Growth Within Washington State

Region	Employment 1951	Employment 1984	% Change 1951-84	Mature Industry Share, 1984	High Growth Industry Share, 1984
Coastal					
Mfg.	30335	28211	-7.0		
Services	3759	16444	337.5		
Total	50656	84525	58.0	27.7	6.0
East Sound					
Mfg.	5368	5069	-5.6		
Services	2170	18545	854.6		
Total	16329	51407	249.4	3.9	14.6
North Sound					
Mfg.	7139	9793	37.2		
Services	1717	11576	674.2		
Total	17396	48249	177.4	10.7	8.3

Region	Employment 1951	Employment 1984	% Change 1951-84	Mature Industry Share, 1984	High Growth Industry Share, 1984
West Sound					
Mfg.	96782	169240	74.9		
Services	32293	209098	647.5		
Total	280926	798017	184.1	4.7	22.8
Clark County					
Mfg.	7890	14259	80.7		
Services	1098	10277	936.0		
Total	14550	44370	204.9	14.5	13.5
Yakima County					
Mfg.	3605	7007	94.4		
Services	2077	11336	445.8		
Total	18762	40892	118.0	9.7	8.4
Benton-Franklin					
Mfg.	8210	12243	49.1		
Services	1105	13960	1163.3		
Total	19695	43121	118.9	8.4	20.2
Walla Walla County					
Mfg.	962	2080	116.2		
Services	1027	5517	437.2		
Total	5899	13179	123.4	7.6	7.2
Spokane County					
Mfg.	13203	17911	35.6		
Services	7040	32764	365.4		
Total	27167	61807	127.5	5.2	15.2
Rural Eastern Washington					
Mfg.	6568	13125	99.8		
Services	3065	13976	356.0		
Total	27167	61807	127.5	12.9	6.5
Washington Total					
Mfg.			54.7		
Services			512.6		
Total			149.7		
U.S. Total					
Mfg.			19.8		
Services			480.6		
Total			105.7		

Sources: U.S. Bureau of the Census, 1951, 1984.

Note: The mature industry category includes food processing, lumber and wood products, pulp and paper products, and shipbuilding. The high growth industry category includes plastic products, computer production, communications equipment, electronic components, aircraft production, instruments, finance, insurance, and real estate, business services, and miscellaneous services. Some of the data are estimates because ranges are sometimes reported for employment figures to avoid individual firm disclosure at the county level.

As can be seen in Table 9, employment growth rates from 1951 to 1984 vary significantly across regions. The total employment growth rate for Clark County and the East, North, and West Sound regions are above the rate for the state as a whole, while all the other

regions are below the state growth rate. The timber dependent coastal counties experience the lowest growth rate of all, one that falls well below the growth rate for the U.S. as a whole. Clearly, the benefits of a relatively high rate of state employment growth since the 1950s have not been evenly spread across the sub-regions of the state. Apart from relatively rapid growth in Clark County, the high growth regions of the state are concentrated entirely in the Puget Sound area.

Regional long wave theory provides a possible explanation for this phenomenon. Sub-regions of the state that are experiencing the slowest growth could well be dependent for employment on those industries that served as the engines of growth for the state's first long wave expansion lasting from approximately 1880 to 1920. These industries reached maturity in the first long wave and are now experiencing relatively slow employment growth or even employment decline, and they include food processing, lumber and wood products, pulp and paper products, and shipbuilding.

On the other hand, regions of the state experiencing rapid growth could be capturing the new high growth industries leading the current long wave growth phase that began in 1950. These high growth industries and sectors identified above include plastic products, computer production, communications equipment, electronic components, aircraft production, instruments, finance, real estate, and insurance, business services, and miscellaneous services.

The percent of total private sector employment for each region in mature and high growth industries are presented in Table 9. The East and West Sound regions have a small percentage of their total employment in mature industries and a large percentage in high growth industries, and quite high employment growth between 1951 and 1984. The North Sound region has a relatively high employment growth rate even though it has a relatively small percentage of its employment in high growth industries. This could be explained by the development of refineries and aluminum production facilities that are not included in either the high growth or mature industry categories.

Clark County in the southern part of the state has a relatively high percentage of its work force in both mature and high growth industries and has a relatively high employment growth rate. The bulk of the mature industry category for Clark County is in pulp and paper, an industry that has experienced modest employment gains in the state. In addition, Clark County is a suburb of Portland and has likely experienced some growth as a consequence of growth in the Portland metropolitan area.

The remainder of the state has experienced an employment growth rate below that of the state as a whole. The coastal counties have the poorest growth rate, the highest percent of employment in the mature industry category, and the lowest percent of employment in the high growth industry category. This reflects the heavy dependency of these counties on the lumber industry, an industry that experienced significant employment decline between 1951 and 1984.

The eastern Washington counties have experienced a somewhat higher growth rate than the coastal counties and generally depend less on mature industries and have slightly higher percentages of employment in high growth industries, but not as high as the East and West Sound regions. Food processing constitutes a big portion of the mature industry

category in eastern Washington, and food processing has experienced some employment growth in the state since 1951.

Two regions in eastern Washington do have relatively large percentages in the high growth categories, Benton and Franklin Counties, and Spokane County. The relatively large figure for Benton and Franklin Counties can be explained by the large amount of business services employment in Benton County. This in turn is made up mostly of employment in research laboratories and employment services. Most of these jobs are associated directly or indirectly with the Hanford nuclear facilities and thus depend on the level of federal government spending associated with Hanford. The rate of growth in such spending would, consequently, be a major determinant of employment growth in these categories and employment growth in general.

The relatively large percentage figure in the high growth category for Spokane County could be explained in part by Spokane's function as a major regional business center for eastern Washington. Employment growth in Spokane, particularly in the finance and business services categories, would thus depend to a large extent on economic growth in the entire eastern Washington area and in turn on growth in the agricultural sector. Spokane does on the other hand have a relatively significant amount of employment in computer production, a high growth industry. Nonetheless, Spokane County's growth rate has been in line with the rest of eastern Washington, suggesting that its economy continues to be tied to the local region rather than national high growth industries like computers.

In sum, a dual economy has emerged in Washington State that has its roots in the history of the state's long waves of growth and decline. Those areas of the state that are still dependent on industries that led the state's first long wave are experiencing relatively slow rates of employment growth, while those areas of the state attracting the newer industries that are the engines of growth for the current long wave are experiencing relatively rapid rates of employment growth. The primary concentration of high growth industries is at present on the western shore of Puget Sound and includes the Everett-Seattle-Tacoma metropolitan region. The services sector study undertaken by Beyers and others found that businesses exporting services from the West Sound region were heavily concentrated in and around Seattle and are few in number in Everett and Tacoma (Beyers, et al., 47). If such export oriented services enterprises are indeed a driving force in the state economy, they will have a positive impact on the state's one large metropolitan area rather than its smaller and urban centers and rural areas.

VI. CONCLUSION

The Washington State economy appears to be nearing the final years of a long wave growth phase. The key signs of this are a relatively low rate of new business formation and a declining rate of employment growth relative to the U.S. as a whole. The aircraft and other industries that have served as the mainstay of growth since the 1940s appear to be reaching maturity, and new high technology industries do not appear to be strong enough at this point to take over as primary engines of growth.

The historical pattern observed in the Washington economy is consistent with that observed in other regions of the country. The New England and Middle Atlantic states experienced rapid industrial development and high rates of growth beginning in the middle of the nineteenth century that lasted in to the 1920s. From this point until the late 1970s these states faced rates of employment growth well below the national level, and only in the 1980s have employment growth rates come close to matching those of the U.S. as a whole. Recovery in economic growth was preceded by a relatively lengthy period during which the rate of new business formation was well above the national average.

The Midwestern states, on the other hand, were characterized by manufacturing growth rates above the national level starting in the late 1900s and lasting through the end of World War II, and since then have been faced with a retardation in employment growth rates that became quite serious in the latter 1970s. New business formation in the Midwest since World War II has been consistently below the national average. If an upward movement in new business formation is indeed a precursor to recovery in economic growth as it was for the New England and Middle Atlantic states, then it will be some time before the Midwest experiences a significant economic recovery (Booth, 1986).

Since Washington State, like other western states, has experienced its period of substantial industrial growth at a later point in history than the East or Midwest, the timing of its long wave should be later than for those two regions, a conclusion that is supported by the results reported in this study. If the Washington State experience is like that of other regions of the country, it will ultimately face a slowing of growth relative to the country as a whole as its industries become mature and grow at a slower rate. The analysis of the previous section clearly indicates that this is already happening in those regions of the state dependent on the oldest industries.

While long wave processes may well be important, they are not the only factors determining the pattern of economic growth. In the case of Washington State there are other elements that have to be considered for a comprehensive analysis of the economy. Examples would include the impact of foreign trade on port activity, farm policy, and defense procurement expenditures by the federal government. Any of these factors could either retard or accelerate an underlying long wave trend in the state economy.

If indeed the growth phase of a long wave will come to an end shortly in the Washington State economy, what can be done to soften the blow of growth retardation and to move the economy onto a new long wave? The path out of the stagnation phase of a long wave is the creation of new high growth industries, and such industries are usually created by new

businesses rather than by existing enterprises in aging industries (Booth, 1986). The appropriate role for public policy would thus be to accelerate the rate of new business formation.

In the absence of a national urban or regional economic policy in recent years, states suffering from poor economic growth have begun to experiment with economic development policies on their own. These have included, on the one hand, general tax breaks to all businesses and targeted tax breaks to specific businesses promising to locate within the state or some geographic area such as an enterprise zone, and, on the other, the creation of venture capital funds and technical assistance agencies to provide help for new business startups (Kieschnick; Litvak and Daniels). In addition, some state universities are developing research parks to facilitate technology transfers from the university to private businesses.

The best available evidence suggests that the tax break approach is not very fruitful in accelerating economic growth.[5] For new businesses, taxes play a relatively modest role in determining location or likelihood of economic success. Access to capital, technical assistance, and technology, however, are likely to be very important for new enterprises. If this is the case, then state venture funds, technical assistance agencies, and technology transfer programs could play a role in accelerating the pace of new business formation. In addition, development efforts can be targeted to low income communities or communities suffering from unusually high unemployment rates. Both Massachusetts and Wisconsin have established community development finance authorities that provide capital and technical assistance to producer cooperatives, worker owned businesses, and private businesses that have an association with a community development corporation in economically distressed localities (Booth and Fortis). While programs of this nature have not been in existence long enough for a proper evaluation of their performance, they are at least theoretically on the right track to the extent that an acceleration of new business formation is the solution to the problem of stagnant economic growth.

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ENDNOTES

[1] For a similar view, see Watkins. This view is discussed in more detail in Booth, 448, 451.

[2] At the time the Census was taken in 1919, the layoffs in the shipyards that came with the end of World War I apparently had not yet occurred. If the 35,000 shipyard workers added because of the war were removed from the 1919 manufacturing employment figure, then employment growth in the state would have been slower than for the U.S. as a whole from 1909 to 1919 and more rapid from 1919 to 1929.

[3] The miscellaneous plastics goods industry is composed of a multitude of relatively small firms producing a wide range of products including plastic molds, plastic parts, self-inflating air mattresses, fiberglass products, and plastic containers.

[4] More recent data are available from the Washington State Employment Security Department, but they are not completely comparable to Census data because of differences in collection methods. Census data is needed for the national figures used in this study.

[5] For a complete analysis of this issue, see Kieschnick, and for a somewhat different conclusion see Plaut and Pluta. The tax burden at the state level has no statistically significant effect on new incorporation rates [Booth].

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