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EMPLOYMENT VARIABILITY IN THREE WESTERN PROVINCES: IS THERE MORE STABILITY?

Employment as a primary determinant of economic welfare and social status is arguably the single most important economic policy variable. A number of recent studies have found that over the past quarter century national employment stability both in Canada and the United States was as high in the early 1990s as at any time in the prior two decades [Green and Riddell 1996; Diebold, Neumark and Polsky 1994; Heisz 1996]. A further study reported in *Canadian Economic Observer*, based upon national data from the Labour Force Survey (LFS) and the Longitudinal Worker File (LWF), assessed the extent to which an ongoing shift of jobs to the service sector altered aggregate job stability [Heitz and Cote 1998]. A study of national labour market conditions answers some questions, but it is doubtful that those findings can easily be extrapolated to the experience of individual provinces.

Studies have found substantial variation in the stability of employment, income, and population growth between the provinces and, therefore, in the deviation of provincial conditions from the national conditions [Chambers and Percy 1992, Mansell and Percy 1990]. These economic measures demonstrated that the three western most provinces were far and away the least stable. Therefore, there is evidence of increased national job stability. How does the evidence play in those provinces with the highest historical levels of volatility?

Alberta, British Columbia and Saskatchewan have economies still highly dependent on energy, forest and agricultural products, respectively. The recent roller coaster in commodity prices, the slack demand for western Canadian exporters following on Asian economic turmoil, the environmental pressures on the forest industry, and curtailed American market access for forest products naturally provoke interest in the stability of these three provinces.

The degree of volatility is not a trivial question for either the provincial public or private sectors. In the public sector, for example, it means more stable flows of tax revenues and less risk when making budget estimates. In the private sector, it means a generally more stable environment for human resources management. Effectively, reduced volatility means a lower level of uncertainty for all parts of the economy.

Since recent studies have linked greater job stability to growth in the service sector, it is appropriate to point out only that the sector differs in importance from one province to another, but also that the three provinces do not share the same pattern of relative growth. The service sector is relatively the largest in British Columbia accounting for 69.9% of employment in 1976, increasing gradually and almost continuously to an average of 76.4% in the later 1990s. Saskatchewan, has had the smallest service sector. In 1976, it accounted for just over 60% of employment. Relative growth was steady, rising to some 65% in the mid-eighties, and to an average of just over 69% in recent years. In Alberta, the service sector was 63% of provincial employment in 1976, rose to 72% in the mid-eighties, and has remained in the 71–72% range since that time. Thus, two of the provinces, British Columbia and Saskatchewan, have displayed sustained growth in the sector, while the increased relative importance of the sector in Alberta really occurred between the mid-seventies to the mid-eighties.

METHODOLOGY

The literature offers no universally accepted method of measuring instability. Some approaches fit trend lines to employment in the respective industrial sectors, taking deviations of observed values from either fitted values or the series mean [Brewer and Moomaw 1985; Conroy 1975; Gruben and Phillips 1989]. Other studies employ stationary time series models to distinguish expected from unexpected variability. Instability is then represented by squared deviations of observed from anticipated changes [Mansell and Percy 1990].

This analysis applies a portfolio variance model. This approach measures regional employment variability based on industrial structure. Portfolio variance, a concept widely used by financial analysts, has two basic parts: variance and covariance. When employment in a given industrial sector fluctuates a good deal, the sector has high employment variance. In common parlance, it is a 'boom-bust' sector. Other things equal, the higher employment variance in the industrial sectors making up a provincial economy, the higher the variability in provincial employment.

Provincial employment variability is also determined by whether employment changes in the sectors move in the same or in opposite directions, i.e. by covariance. Should changes in industrial sector employment move in the same direction, the net result is to lower employment stability. Should these changes move in opposite directions, the net effect is to make provincial employment more stable. In sum, lower levels of variance, and greater evidence of negative covariance (rates of industry sector employment change moving on average in opposite directions) indicates greater stability in provincial employment.

The data use the monthly labour force survey of Statistics Canada covering the period from first quarter of 1976 (1976:Q1) to the second quarter of 1998 (1998: Q2). This national survey is the best available continuous record at the provincial level of labour force and employment behaviour.

Published monthly estimates are available for eleven industry sectors: agriculture; non-agricultural primary; utilities; manufacturing; construction; transport, storage and communication; wholesale and retail trade; finance, insurance and real estate (FIRE); community services (health and education); business and personal services; and public administration. Employment portfolio variance was estimated for quarterly natural log differences standardised by the mean quarterly change in each of the 11 sectors. That is, each of the 121 elements of this matrix consists of a relative covariance of the following type:

$$\sigma_{ij} = [1/(n-2)]\,[(u_{it} - u_i / u_i]\,[(u_{jt} - u_j / u_j]$$

where n is the number of observations. The variables u_{it} and u_{jt} are the observed quarterly rates of change in sectors *i* and *j* respectively during quarter *t*. The variables u_i and u_j are the mean rates of change.

The 121 individual components are summed to derive the total employment portfolio variance measure as follows:

$$\sigma P = \Sigma_j \omega_j \sigma^2 + \Sigma_{i \neq j} \Sigma_{j \neq i} \omega_i \omega_j \sigma_{ij}$$

where σ^2 represents the employment variance of sector$_j$, σ_{ij} is the covariance of employment between sector$_i$ and sector$_j$, and ω_i and ω_j are weights that are equal to the average share of each sector's employment in total employment. Each sector contributes to provincial employment portfolio variance through its own variance and its covariance with other sectors. The contribution of each industry is weighted by its share in total employment.

The model makes no attempt to decompose log differences in industry sector quarterly employment into anticipated as opposed to unanticipated change, nor does it require the selection of trend values for each of the eleven sectors.

RESULTS

The first question addressed is whether the portfolio variance approach yields results about job stability consistent with those reported in *Canadian Economic Observer*. TABLE 1 reports estimated national portfolio variance covering two sub-periods: the first era is from the first quarter of 1976 (1976:Q1) to the fourth quarter of 1987 (1987:Q4) and the second from the first quarter of 1988 (1988:Q1) to the second quarter of 1998 (1998:Q2). National portfolio variance of quarterly employment change in natural log differences (converted to percentages) declined in the second period by approximately 23%, or from 0.03679 to 0.02845. The analysis revealed that the decline in weighted variance was almost equal in the goods producing and service sectors. The results, using the methodology adopted here, appear consistent with those reported by Statistics Canada under an alternative approach.

TABLE 1: Portfolio Variance of National Quarterly Employment Change for Two Eras: 1976:Q1 to 1987:Q4 and 1988:Q1 to 1998:Q2

Canada	Portfolio variance
Era 2:1976:Q1 to 1987:Q4	0.03679
Era 2: 1988:Q1 to 1988:Q2	0.02845
Era 2 variance as % of Era 1	77.3

Source: Basic data from the Monthly Labour Force Survey

TABLE 2 reports portfolio variance derived from natural log differences of quarterly employment change in the two periods for each of the three western provinces. Data are converted to percentages. Alberta, in the earlier period, recorded the highest level of employment variability followed in order by Saskatchewan and British Columbia. Levels of portfolio variance in all three provinces substantially exceeded the national, ranging from 6.5 times for Alberta (.2377 / .03679) to 5.2 for British Columbia (.1926 / .03679). In the second period, portfolio variance for two of the provinces changed only slightly. Variance in British Columbia was very nearly the same, while in Saskatchewan there was a decline of about 5%. In British Columbia, variance actually increased while net weighted covariance changed from positive to negative. In Saskatchewan, weighted variance declined slightly while net covariance became somewhat more negative. Effectively, stability in these two provinces was little changed.

Alberta results are markedly different. Portfolio variance declined both absolutely and relatively so that Alberta moved from the least to the most stable of the western provinces over the course of the two eras. The absolute decline amounted to 42% and the ratio of Alberta to national portfolio variance fell from 6.5 to 4.8. TABLE 2 indicates that eight of eleven sectors, accounting for some 85% of aggregate employment in Alberta, experienced reduced variance. By far the largest share of the decline in portfolio variance was attributable to lower variance but a small amount occurred because covariance moved from net positive to net negative in the second era. In fact, nine of eleven sectors displayed negative covariance

compared with only two sectors exclusive of agriculture in the first era.

Sectors where Alberta variance exceeded British Columbia's in the earlier period—manufacturing, construction, FIRE, community services, business and personal services, and public administration—were actually lower in the second. These are sectors that account for a substantial majority of total employment in both provinces. In Saskatchewan, variance in the second era was larger in agriculture, manufacturing and construction.

TABLE 2: Portfolio Variance of quarterly percent changes in Employment: Alberta, British Columbia and Saskatchewan for each of two eras: 1976:Q1 to 1987:Q4 and 1988:Q1 to 1998:Q2

ERA 1: 1976:Q1 to 1987:Q/4	Alberta		British Columbia		Saskatchewan	
SECTOR*	**Variance**	**Covariance**	**Variance**	**Covariance**	**Variance**	**Covariance**
Agriculture	0.5046	-0.0394	0.7523	-0.0773	0.1245	-0.3508
Non-ag Primary	0.4989	0.2555	0.5378	-0.3001	0.9821	0.3017
Utilities	1.1006	0.0363	1.4387	-0.0745	2.8530	0.1375
Manufacturing	0.2489	0.2355	0.1581	-0.0183	0.2812	0.1125
Construction	0.4023	0.2458	0.2623	0.0582	0.2699	-0.2608
Transport, Storage, Comm.	0.1806	0.0220	0.1323	-0.0089	0.4202	-0.1611
Trade	0.0887	0.0251	0.0909	-0.0459	0.1061	0.1914
FIRE	0.3076	-0.2439	0.3465	-0.1075	0.3881	-0.0909
Community Services	0.1251	0.0083	0.1188	0.1923	0.0961	-0.0744
Business and Personal Serv.	0.1348	0.1219	0.1023	0.0317	0.1511	-0.0482
Public Administration	0.1517	-0.0431	0.1484	0.0387	0.1506	-0.1079
Portfolio (weighted) Variance/covariance	**0.2377**		**0.1926**		**0.2091**	

ERA 2: 1988:Q1 to 1998:Q2	Alberta		British Columbia		Saskatchewan	
SECTOR*	**Variance**	**Covariance**	**Variance**	**Covariance**	**Variance**	**Covariance**
Agriculture	0.1854	-0.1406	0.8093	-0.4227	0.2738	-0.5164
Non-ag Primary	0.2046	-0.0888	0.4155	-0.1183	0.5671	-0.2444
Utilities	2.0644	-0.4254	2.0223	-0.2605	1.7740	0.2194
Manufacturing	0.1817	-0.0766	0.1459	-0.0273	0.2925	0.3108
Construction	0.1625	-0.0616	0.2432	-0.1689	0.5531	0.0405
Transport, Storage, Comm.	0.2241	0.0103	0.2605	0.0754	0.2735	-0.0714
Trade	0.0593	0.0333	0.1204	-0.0568	0.0726	-0.3547
FIRE	0.2377	0.0617	0.3356	-0.2426	0.3669	0.2812
Community Services	0.0661	-0.1128	0.1082	-0.2422	0.0354	-0.1619
Business and Personal Serv.	0.0590	-0.1290	0.1077	-0.0870	0.1380	-0.1080
Public Administration	0.2106	-0.2963	0.3961	-0.0523	0.1429	0.1119
Portfolio (weighted) Variance/covariance	**0.1364**		**0.1934**		**0.1933**	

*Sector variance and covariance are unweighted by shares in total employment.

TABLE 3 reports the contribution of the goods and service sectors to changes in portfolio variance between the two periods. In Alberta, weighted variance/covariance in both sectors declined corresponding to the national experience. In the goods sector, variance fell by 50% and service sector variance by some 30%. In the first period, variance in the goods sector accounted for just under 60% of total variance, while in the second, each sector contributed in almost equal shares to a substantially lower portfolio variance.

TABLE 3: Contribution of the Goods and Service Sectors to the Change in Portfolio Variance between the two eras: Alberta, British Columbia and Saskatchewan

	1976:Q1-1987:Q4 weighted variance and covariance	1988:Q1-1998:Q2 weighted variance and covariance	% change
Alberta			
Goods sector	0.1387	0.0678	-51.2
Service sector	0.0990	0.0686	-30.7
Total Variance	**0.2377**	**0.1364**	
British Columbia			
Goods sector	0.0951	0.0750	-21.2
Service Sector	0.0975	0.1184	+21.5
Total Variance	**0.1926**	**0.1934**	
Saskatchewan			
Goods Sector	0.1057	0.1158	+9.6
Service Sector	0.1034	0.0775	-25.1
Total Variance	**0.2091**	**0.1933**	

In British Columbia, the fall in the weighted variance/covariance of the goods sector was offset by an increase in the service sector. In Saskatchewan, goods sector variance/covariance rose but this was more than offset by the fall in the service sector variability.

RESULTS WITH FIXED VS. VARIABLE SECTOR WEIGHTS

In this portfolio variance model, the results can be influenced by changes in industrial structure. The weights used in the analysis, reported in TABLE 1 through TABLE 3, are the quarterly average composition of employment in the respective provinces in each of the two eras. However, it is helpful to see how changes in variability may be the result of changes in industrial structure. TABLE 4 reports portfolio variance results when the composition of employment in the second era is assumed to be the same as in the earlier period.

TABLE 4 reveals that using fixed weights in the calculation of portfolio variance changed the results very little in the case of Canada and Alberta but were more important for British Columbia and Saskatchewan. Weight changes accounted for 16.9% of the decline in variability in the case of Canada and 7.1% for Alberta. The situation in British Columbia and in Saskatchewan is rather different. In British

Columbia, the change in the structure of employment is entirely responsible for holding portfolio variance at approximately the same level in the later period. In Saskatchewan, about one-half of the modest decline in variability resulted from a changing industrial structure.

TABLE 4: Difference in Portfolio Variance Percentage with Fixed vs. Actual Employment Composition Weights in Era 2, 1988:Q1-1998:Q2

	Portfolio variance Era 2 with fixed weights (2)	Portfolio variance Era 2 with actual weights (3)	Difference (2)-(3)	Difference as a % of the inter-period change in variance
Canada	0.02986	0.02845	.00141	16.9%
Alberta	0.1436	0.1364	.0072	7.1%
British Columbia	0.2105	0.1934	.0171	**
Saskatchewan	0.2018	0.1933	.0085	53.8%

** Since British Columbia portfolio variance rose very slightly in the second period compared with first, the approximate equality in portfolio variance levels is attributable to changes in the industrial composition of employment.

BETA MEASURES OF VOLATILITY

TABLE 5 reports indexes of variance, covariance and the contribution of the eleven sectors to Alberta, British Columbia and Saskatchewan employment variability during the two eras. The first set of columns contains measures of variance, the second set shows two measures of covariance, and the third set contains a measure of a sector's contribution to total employment variability. The variance and covariance indexes express, in ratio form, each sector's variance and covariance respectively to aggregate weighted average variance and covariance. In the variance column, for example, the index ratio of 4.73 for the Alberta utilities sector in the first era means that the sector is 4.73 times more volatile than the weighted employment variance of all sectors combined. The covariance index measures the covariance of that sector relative to the absolute covariance weighted average for the all sectors. The two beta columns report a weighted average of the variance and covariance measures and indicate the overall contribution of each sector to total employment variability. If beta is equal to 1.0 then the sector is neutral in its effect on total employment, i.e., it neither raises nor lowers the variance of total employment. A beta greater than 1.0 means that the sector raises total employment variability, while a beta less than 1.0 means that the sector reduces overall variance.

TABLE 5 reveals that high variance in a sector is not, in itself, a contributor to increased volatility. High variance may be offset by strong negative covariance. For example, in the second era in Alberta, a non-agricultural primary industry variance index in excess of 2.00 is offset by negative covariance with the effect of reducing the beta value to below unity. In Saskatchewan, very high negative covariance in the agricultural sector in the second era yields a negative beta. Notable in the case of Alberta are beta values less than 1.0 for both the agriculture and non-agricultural primary sectors in the second era. Similarly, betas less than 1.0 appear in manufacturing and construction for Alberta and British Columbia in the later era as a result of negative covariance levels. As might be

expected, service sectors in all three provinces generally have the lower betas. There are exceptions: the transportation, storage and communication sector in Alberta and British Columbia in the second era, and in Saskatchewan in both periods; FIRE was a contributor to volatility in Saskatchewan in both periods, in British Columbia in the first ,and in Alberta in the second.

PARSING THE CHANGES IN ALBERTA'S EMPLOYMENT VARIANCE

In sum, the above analyses show British Columbia and Saskatchewan recorded little decline in portfolio variance; the decline in Alberta employment variability was large and apparent in both the goods and services sectors. Alberta emerges as the more interesting case, having moved from the most volatile of the three provinces in the first era to the least in the second, and also having recorded a decline in volatility relative to national experience. The question then becomes how we do parse the changes in Alberta employment?

To better understand what has happened in Alberta, we consider specifically the sectors of agriculture, non-agricultural primary, manufacturing, and business and professional services. These four sectors accounted for just under one half of portfolio variance in the first era. That fell to just over one-third (35%) of the much smaller variance in the second period.

(1) In **agriculture**, several significant changes have occurred. These include the increased importance of livestock production relative to traditional grains; the increase in oilseed plantings; and the increase in the number of hectares planted in specialised crops such as potatoes, peas and mustard seed. Greater stability in agriculture is a reflection of the differentiable crop and market conditions accompanying these commodities.

(2) In the **non-agricultural primary sector**, variance fell by three fifths. Employment in this Alberta sector consists overwhelmingly of energy industry workers (in excess of 90%). The single most important development in the Alberta energy sector is the increased absolute and relative importance of natural gas. The continental market for natural gas opened up with the FTA, so that presently the dollar value of gas exports is at least equal in importance to that of crude oil. This is a welcome change in the energy industry, quite apart from the environmental advantages of gas. The Statistics Canada Raw Material Price Index reveals that the volatility of monthly natural gas prices over the past twenty years is substantially lower—almost two thirds lower—than crude oil prices over the same period. In other words, the diversification has occurred with a less price volatile form of energy.

(3) Using Statistics Canada data on exports (from TIERS and the CTA), the value of **manufacturing shipments and sector employment** (Employment, Earnings and Hours) provide insights into important developments in the Alberta manufacturing sector over the past two decades. Export data is particularly valuable, since it indicates the viability of the activity in a highly competitive marketplace. The need is to identify longer-term trends in contrast to focussing on annual changes that largely reflect cyclical influences on demand conditions. For example, in years of cyclical expansion the share of durable manufacturing tends to increase and that of non-durable manufacturing shipment and employment shares decrease. Data for aggregate employment and shipments indicate greater diversity within both the non-durable and durable goods sectors of

manufacturing. Changes in the share of value of manufacturing shipments and in employment are summarised for selective activities in TABLE 6. Increased shares in these segments of manufacturing are indicative of greater diversification.

There are some important segments of manufacturing where employment and shipment shares do not record a long-term relative increase. TABLE 7 examines the export performance of these, together with those reported in TABLE 6, by a comparison of 1988 and 1998 foreign export values for selected exports. The data reveal not only that the value of these exports quadrupled, but that their share of Alberta's total exports grew from 16.8% to 27.5%. The significant conclusion is that these manufactured products were able to compete successfully in the international marketplace.

(4) In the **service sector**, the decline in overall variance was some 31%, with the most notable change a fall of one-half in the weighted variance of the business and personal services component. This component comprises, on the personal service side, a wide range of activities from hotel and restaurant services, to amusement and recreational services, to a number of other personal services. As a result, these components are sensitive to the tourist industry and to changes in the level of household spending.

Professional and technical activities dominate the business services, a sector which includes computer analysts and software writers, accountants, lawyers, engineers, architects, management consultants, those in personnel and advertising agencies, and other trained specialists. These activities are subject to rather different sets of market demands than the providers of personal services mentioned above.

TABLE 6: Sectors with Consistent Increases in their Relative Shares of Manufacturing Shipments and/or Manufacturing Employment since the Early 1980s

	Manufacturing shipments	Manufacturing employment
electrical equipment	yes	yes
machinery	yes	no
chemicals	yes	no
pulp and paper	yes	yes
plastics	no	yes
transport equipment	yes	yes
furniture and fixtures	yes	yes
scientific and professional equipment	yes	yes

Source: CANSIM matrices 9578, 9591, 4411.

TABLE 7: 1988 and 1998 Comparison of the Value of Foreign Exports from Alberta for Selected Categories

	HS Code	1988 export value ($millions)	1998 export value ($millions)

Meat	02	$159	$1,093
Chemicals	28 & 29	986	1,216
Wood products	44	229	1,159
Wood pulp	47	385	1,194
Paper & board	48	8	222
Nickel articles	75	21	198
Machinery	84	172	1,070
Electrical	85	113	1,575
Vehicles & parts	87	42	174
Instruments	90	34	225
Furniture / fixtures	94	33	338
Total of above		**$2,182**	**$8,464**
As % of total merchandise exports		**16.8%**	**27.5%**

Source: Statistics Canada, TIERS / CTA

It is likely that the decline in variance in the second period reflects the changing balance between business services and personal services. In the early eighties, slightly more than three out of four jobs were in personal services. However, business service jobs have grown much more rapidly since the late eighties so that they now account for over one-third of jobs while the personal service share has fallen to more than three-quarters to less than two-thirds. Thus, diversification has occurred within this sector with a rising share of professionally and technically trained individuals.

Greater stability in the sector may also result from a much more active pursuit of international business opportunities by many business service enterprises post-1988 than was the case in the earlier period. The widening of their market not only expands, but also reduces the fluctuations in demand encountered by these professionally based enterprises.

(5) Finally, **employment volatility** will be reduced when self-employment and paid employment are substitutes. There is a negative relationship, stronger in the second era, between paid and self-employment in each of the three provinces. However, the degree of substitution is stronger in Alberta than in either Saskatchewan or British Columbia. In the case of Saskatchewan, the substitution appears to be dominated by shifts out of agriculture (the largest single group of the self-employed) into other pursuits.

SUMMARY AND CONCLUSIONS

Portfolio analysis, a favourite tool of financial analysts and investment counsellors, has been used as a criterion to assess change in the employment volatility of the three western most provinces in the last decade. Employment is measured by the quarterly rate of change in those industry sectors reported in the Monthly Labour Force Survey of Statistics Canada and

publicly accessible through the CANSIM base. The analysis covers two periods: the first from the beginning of 1976 to the final quarter of 1987; and the second, from the first quarter of 1988 to the second quarter of 1998. The study presents comparisons between the two eras in employment portfolio variance and covariance.

The portfolio analysis results show that in the case of two provinces, British Columbia and Saskatchewan, there was little change in employment variability. In British Columbia employment volatility remained the same in the later period compared with the earlier period only because of a change in the structure of the provincial economy. In Saskatchewan about one half of the decline in volatility levels was the result of a structural change.

The results for Alberta are very different. Not only did the absolute value of portfolio variance decline (little of it caused by structural change), but it also fell relative to a similar measure for Canada, with both the goods producing and the service sectors recording reductions. The variability in both sectors declined substantially, with the largest decline in the goods producing sector.

Important factors contributing to reduced volatility in Alberta in the last decade are:

- more diversified agriculture;
- increased relative importance of natural gas in the non-agricultural primary sector;
- emergence of new and / or expanding, internationally competitive segments of manufacturing (such as electrical / telecommunications equipment, meat processing, mechanical equipment, furniture);
- rising relative importance of business professional groups in the business and personal services sector;
- the strong ability to substitute between paid and self-employment.

The diversification of an economy is achieved neither quickly nor easily. It evolves. The evolution has stronger momentum when the economic and policy environment is supportive of the necessary transitions. It is not inappropriate to speculate, without providing definitive answers, about what supportive circumstances may have been present in the Alberta case. The following need to be considered:

The **Free Trade Agreement** created a new range of market opportunities for Alberta enterprises. Certainly—absent all else—it facilitated diversification within the energy industry by guaranteeing US market access for natural gas producers. But the FTA did more than this. It also presented to businesses in many sectors a relatively benign environment for acquiring knowledge and experience as exporters—even for an initial venture into exporting. It is clear that many members of the Alberta business community took good advantage of this extraordinarily significant change in trade policy.

The energy industry, the core non-agricultural activity in the province for many decades, can be classified as a '**high tech'** industry. The professional and technical cadres of industry rank among the most highly trained and educated members of the labour force, indeed of society generally. The more highly trained and educated have the capacity to transfer—and where necessary acquire or modify—knowledge applicable to a range of other activities, and most importantly, other 'high tech' activities. We need to know more about the extent of this in Alberta, and the role these potential 'spinoffs' may have played in reducing volatility.

What has happened in the last decade suggests a **reassessment of the economic diversification policies** pursued by previous governments. These have, in recent years, been

subjected to harsh criticism. Perhaps it is time to evaluate them with a less politically charged cost-benefit analysis.

Finally, reduced volatility and increased diversification do have costs. These include **environmental costs**. The reality is, that when structural changes take place, there can be adverse environmental impacts that may be different in type and/or degree from those previously experienced. These costs need to be recognised and addressed forthrightly to secure the conditions for the higher quality of life offered by structural changes in the economy.

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