

Increasing Light Vehicle Weights and Cost Responsibility

The increased popularity of larger sport utility vehicles (SUVs) and pickup trucks in recent years has resulted in an increase in the average weight of light passenger vehicles on Oregon roads. This article briefly summarizes the recent trends in light vehicle weights and their implications for the relative responsibility of these vehicles for highway expenditures.

Recent Trends in Light Vehicle Gross Weights

By combining Driver and Motor Vehicle Services Division information with vehicle weight data obtained from R.L. Polk, Inc., Policy Unit staff has been able to calculate how Oregon passenger vehicle weights have changed over the past two decades. The data reflect the mean gross weight of Oregon passenger vehicles by year of manufacture from 1981 through 2002, not the average weight of the vehicles on the road in any particular year. Vehicle weight is defined as the base shipping weight of the shortest wheelbase of each model of vehicle. The numbers therefore provide a lower bound for weights and the calculated means somewhat understate the actual gross weights of passenger vehicles over this period.

With these caveats in mind, the data do show a clear trend toward higher passenger vehicle weights since 1981, particularly over the last ten years of the period. Table 1 summarizes the annual data in five-year increments from 1981 to 2000 and for the two-year period 2001-2002. It shows the mean gross weight of Oregon passenger vehicles has increased from about 2,950 pounds for vehicles manufactured in the early 1980s to over 3,650 pounds for vehicles manufactured in the past couple years. This is an increase of over 700 pounds, or 24%. Although not insignificant, it translates to an

average annual increase of only about 1% over this entire period and is perhaps smaller than some might suspect based on casual observation.

The table also illustrates the trend toward higher passenger vehicle weights has been most pronounced for vehicles manufactured since the mid-1990s. Over this period, the mean gross weight of Oregon passenger vehicles has increased at an average rate of over 2% per year. This largely reflects the increased popularity of the new breed of larger SUVs in recent years.

Table 2 provides additional detail on how the weighted average distribution of passenger vehicle weights has changed over the past two decades. As shown, the share of Oregon passenger vehicles with base shipping weights of 2,000 pounds or less has declined substantially since the early 1980s. At the other end of the spectrum, the share of vehicles with base weights over 6,000 pounds has increased in recent years, but is still quite small (less than 1%). A significant majority of passenger vehicles still have base weights between 2,001 and 4,000 pounds, although the share accounted for by this group has fallen from over 84% in the 1980s and early 1990s to about 71% in the last couple of years. By far the largest growth has been in the 4,001-6,000 pound group. The share of the total accounted for by this group has increased from under 10% in the early 1980s to over 28% in the last two years.

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Implications for Cost Responsibility

What do the trends in passenger vehicle gross weights summarized above mean for the relative cost responsibility of light vehicles?¹ Although perhaps surprising to some, the simple and quick answer to this question is “not much.”

The reason is that only a very small portion of the cost responsibility of light vehicles relates to or is dependent on their weight. The difference in pavement damage imposed by a 6,000-pound large SUV versus a 3,500-pound compact car is inconsequential as compared to the difference in the damage imposed by either of these vehicles versus a fully-loaded, 80,000-pound truck. This is true even under the new National Pavement Cost Model (NAPCOM) results.² The difference in pavement responsibility between two light vehicles, in fact, is significantly more dependent on whether either is operated with studded tires than on whether one weighs 2,500 pounds more than the other.

Light vehicles account for 92% of the total, statewide vehicle miles of travel in Oregon, a percentage that is generally even higher on congested urban routes. The responsibility of these vehicles therefore is largely a function of the fact they are assigned a large majority of those costs related to relieving congestion by increasing highway capacity. The responsibility of light vehicles, in short, derives primarily from their sheer numbers and contribution to the need for additional capacity, not from their weight.

One element of the changing physical characteristics of passenger vehicles that might have some small impact on their relative responsibility is size. Because the average weight of passenger vehicles has increased in recent years, their size has probably increased as well. It is likely, however, that some of the increase in average weights has resulted from additional safety features such as airbags, stronger bumpers, steel side-impact bars, etc. Again, though, the responsibility of light vehicles results primarily from their large numbers and not from either their weight or size. The fact that the average passenger vehicle is slightly larger than was the case in past years should therefore have only a quite minor impact on the relative responsibility of these vehicles.

It should also be noted that, other things equal, the larger and heavier any vehicle, the lower will be its fuel efficiency. Hence, to the extent the larger SUVs have a slightly higher per-mile cost responsibility than the traditional passenger car, this is largely if not totally compensated for by the lower fuel efficiency and higher fuel tax payments of these vehicles.

Summary

Data on vehicle registrations and base shipping weights confirm the average weight of Oregon passenger vehicles has increased over the past two decades. This increase has been most pronounced since the mid 1990s and coincides with the heightened popularity of larger SUVs and pickup trucks in recent years. The cost responsibility of these vehicles, however, derives primarily from their sheer numbers and contribution to the need for additional highway capacity, not from their size and/or weight. The trend toward higher passenger vehicle weights has therefore had only a minor impact on the responsibility of these vehicles relative to that of trucks and other heavy vehicles. Additionally, the lower fuel efficiencies attained by the new breed of larger SUVs and pickup trucks means their slightly higher cost responsibility is largely if not totally offset by their higher per-mile fuel tax payments.

¹ The Oregon highway cost allocation or responsibility studies define light vehicles as those having gross weights of 8,000 pounds or less, although there is currently some interest in redefining light vehicles as those having gross weights of 10,000 pounds or less. This change would have only a negligible impact on the relative cost responsibility of light versus heavy vehicles and may be proposed to the 2005 Oregon Legislature.

² See “New Research on Pavement Damage Factors”, *Policy Notes*, June 2003 for a discussion of the new NAPCOM results.

Period	Number of Observations	Simple Average of Mean Gross Weights (Pounds)	Increase from Previous Period	% Increase from Previous Period
1981 - 1985	241,738	2,957	-	-
1986 - 1990	504,249	2,988	31	1.0%
1991 - 1995	637,040	3,179	191	6.4%
1996 - 2000	779,156	3,519	340	10.7%
2001 - 2002	205,589	3,665	146	4.1%

Source: ODOT DMV registrations data and Polk, Inc. VIN datasets. Vehicle weight based on base shipping weight for the shortest wheelbase of each model of vehicle.

Period	Percent Distribution by Weight Group (Pounds)			
	2,000 or less	2,001 - 4,000	4,001 - 6,000	Over 6,000
1981 - 1985	5.9%	84.5%	9.6%	0.0%
1986 - 1990	4.4%	84.4%	11.2%	0.0%
1991 - 1995	2.7%	84.7%	12.4%	0.2%
1996 - 2000	0.7%	74.2%	24.8%	0.3%
2001 - 2002	0.2%	71.1%	28.3%	0.4%