

1 *Penalties for Speeding and their Effect on*
2 *Moving Violations: Evidence from Quebec*
3 *Drivers*

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11 *Abstract.*

12 *Résumé.*

13
14 JEL classification: K42, K49

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	Logistic Regression				Linear Probability Model		
	Marginal Effects AME	Estimate MER	Standard Error	Sig.	Estimate	Standard Error	Sig.
Drivers Aged Age Group: 16-19 (7,777,777,777 observations)							
Policy Indicator	-6.6974	-13.0280	-0.0853	0.0045 **	-6.5742	0.3539	**
Drivers Aged Age Group: 20-24 (7,777,777,777 observations)							
Policy Indicator	-8.5951	-23.2737	-0.1199	0.0029 **	-8.4513	0.2059	**
Drivers Aged Age Group: 25-34 (7,777,777,777 observations)							
Policy Indicator	-6.6050	-20.6684	-0.1268	0.0021 **	-6.5547	0.1102	**
Drivers Aged Age Group: 35-44 (7,777,777,777 observations)							
Policy Indicator	-3.9187	-12.7882	-0.0877	0.0021 **	-3.9221	0.0956	**
Drivers Aged Age Group: 45-54 (7,777,777,777 observations)							
Policy Indicator	-3.0705	-11.3413	-0.0837	0.0022 **	-3.0670	0.0822	**
Drivers Aged Age Group: 55-64 (7,777,777,777 observations)							
Policy Indicator	-2.2195	-9.7673	-0.0775	0.0030 **	-2.2167	0.0843	**
Drivers Aged Age Group: 65-199 (7,777,777,777 observations)							
Policy Indicator	-0.4329	-2.5930	-0.0232	0.0041 **	-0.4337	0.0768	**

TABLE 1

Regressions for all offences, by age group

For each regression, the dependent variable is an indicator that a driver has committed any offence on a particular day. All regressions contain age category and demerit point category controls, as well as monthly and weekday indicator variables. The baseline age category comprises drivers under the age of 16. The heading “Sig.” is an abbreviation for statistical significance, with the symbol * denoting statistical significance at the 0.1% level and ** the 0.001% level. In the linear probability model, coefficients and heteroskedasticity-robust standard errors are multiplied by 100,000.

	Logistic Regression				Linear Probability Model			
	Marginal Effects AME	Estimate MER	Estimate	Standard Error	Sig.	Estimate	Standard Error	Sig.
Male Drivers (5,335,033,221 observations)								
Model without age-policy interaction:								
Policy	-5.8346	-23.5011	-0.1113	0.0012	**	-5.9663	0.0628	**
Model with age-policy interaction:								
Policy	-0.3718	-1.4247	-0.0195	0.0386		-1.0915	0.7342	
Age 16-19 * policy	-10.6130	-24.0600	-0.1107	0.0389		-11.1587	0.9191	**
Age 20-24 * policy	-10.8708	-23.8645	-0.1300	0.0387	*	-11.9225	0.8017	**
Age 25-34 * policy	-7.6030	-19.9233	-0.1301	0.0387	*	-8.6158	0.7536	**
Age 35-44 * policy	-4.5014	-12.8637	-0.0891	0.0387		-5.0295	0.7484	**
Age 45-54 * policy	-3.1065	-9.5411	-0.0713	0.0387		-3.5740	0.7450	**
Age 55-64 * policy	-2.0814	-6.9077	-0.0594	0.0387		-2.5200	0.7455	*
Age 65+ * policy	0.0269	0.1009	0.0011	0.0389		-0.2808	0.7427	
Female Drivers (4,340,212,273 observations)								
Model without age-policy interaction:								
Policy	-0.7812	-4.2791	-0.0294	0.0019	**	-0.8000	0.0495	**
Model with age-policy interaction:								
Policy	-0.3697	-1.8779	-0.0760	0.1304		-0.7470	0.6348	
Age 16-19 * policy	2.5923	9.5218	0.0625	0.1307		0.7804	0.7413	
Age 20-24 * policy	1.7554	6.0629	0.0415	0.1305		-0.0442	0.6765	
Age 25-34 * policy	0.6728	2.4781	0.0200	0.1304		-0.9585	0.6483	
Age 35-44 * policy	1.6309	6.1424	0.0508	0.1304		0.0531	0.6458	
Age 45-54 * policy	1.0967	4.4729	0.0450	0.1304		-0.1831	0.6424	
Age 55-64 * policy	1.0472	4.6017	0.0587	0.1305		0.1339	0.6424	
Age 65+ * policy	1.6217	7.6916	0.1335	0.1306		0.9727	0.6416	

TABLE 2

Regressions for all offences

For each regression, the dependent variable is an indicator that a driver has committed any offence on a particular day. All regressions contain age category and demerit point category controls, as well as monthly and weekday indicator variables. The baseline age category comprises drivers under the age of 16. The heading "Sig." is an abbreviation for statistical significance, with the symbol * denoting statistical significance at the 0.1% level and ** the 0.001% level. In the linear probability model, coefficients and heteroskedasticity-robust standard errors are multiplied by 100,000.

	Logistic Regression					Linear Probability Model		
	Marginal Effects AME	Estimate MER	Estimate	Standard Error	Sig.	Estimate	Standard Error	Sig.
Male Drivers (5,335,033,221 observations)								
All point values	-5.8346	-23.5011	-0.1113	0.0012	**	-5.9663	0.0628	**
1 point	0.3993	1.1872	0.0953	0.0043	**	0.3930	0.0177	**
2 points	-0.3960	-1.3014	-0.0191	0.0019	**	-0.4315	0.0394	**
3 points	-4.7086	-21.2669	-0.1872	0.0017	**	-4.7786	0.0436	**
4 points	-0.0725	-0.5024	-0.1252	0.0114	**	-0.0804	0.0066	**
5 points	-0.8123	-6.5090	-0.6470	0.0080	**	-0.8189	0.0100	**
7 points	-0.1607	-1.4815	-0.7392	0.0193	**	-0.1625	0.0042	**
9 or more points	-0.0657	-0.2363	-0.2501	0.0170	**	-0.0675	0.0045	**
Female Drivers (4,340,212,273 observations)								
All point values	-0.7812	-4.2791	-0.0294	0.0019	**	-0.8000	0.0495	**
1 point	0.5197	2.3386	0.2124	0.0062	**	0.5174	0.0150	**
2 points	0.3712	1.7956	0.0303	0.0028	**	0.3613	0.0336	**
3 points	-1.4226	-8.8404	-0.1256	0.0029	**	-1.4289	0.0323	**
4 points	-0.0011	-0.0093	-0.0098	0.0293		-0.0010	0.0032	
5 points	-0.2126	-3.1046	-0.7494	0.0187	**	-0.2105	0.0053	**
7 points	-0.0195	-0.5213	-0.9113	0.0695	**	-0.0191	0.0015	**
9 or more points	-0.0180	-0.0516	-0.1541	0.0282	**	-0.0180	0.0033	**

TABLE 3

Regressions by ticket-point value

In each row, the dependent variable is an indicator that a driver has committed an offence with the stated point value on a particular day. The categories of tickets with 3, 5 and 7 points includes tickets with 6, 10 and 14 points after the policy change, respectively, and the category with 9 or more points includes tickets with all corresponding doubled values after the policy change. All regressions contain age category and demerit point category controls, as well as monthly and weekday indicator variables. The baseline age category comprises drivers under the age of 16. The heading “Sig.” is an abbreviation for statistical significance, with the symbol * denoting statistical significance at the 0.1% level and ** the 0.001% level. In the linear probability model, coefficients and heteroskedasticity-robust standard errors are multiplied by 100,000.

	Logistic Regression				Linear Probability Model		
	Marginal Effects AME	Estimate MER	Standard Error	Sig.	Estimate	Standard Error	Sig.
Male Drivers (921,131,812 observations)							
All point values	-38.3085	-57.3556	-0.3732	0.0021 **	-38.0770	0.2114	**
1 point	-0.5567	-0.6172	-0.0735	0.0076 **	-0.5454	0.0572	**
2 points	-7.7110	-9.4813	-0.2111	0.0035 **	-7.7125	0.1261	**
3 points	-24.6472	-39.8692	-0.4677	0.0029 **	-24.5075	0.1520	**
4 points	-0.9036	-2.2192	-0.8975	0.0228 **	-0.8445	0.0205	**
5 points	-3.3687	-8.0148	-1.0016	0.0124 **	-3.3206	0.0393	**
7 points	-0.7491	-1.6777	-1.1495	0.0291 **	-0.7270	0.0173	**
9 or more points	-0.3658	-0.4571	-0.7647	0.0319 **	-0.3543	0.0145	**
Female Drivers (249,294,614 observations)							
All point values	-26.2094	-42.9183	-0.4252	0.0052 **	-26.0411	0.3154	**
1 point	-0.1042	-0.1669	-0.0239	0.0193	-0.0916	0.0830	
2 points	-5.9275	-8.6399	-0.2441	0.0082 **	-5.9044	0.1970	**
3 points	-17.7920	-29.9523	-0.5749	0.0075 **	-17.6976	0.2250	**
4 points	-0.2546	-0.5826	-1.2986	0.1060 **	-0.2424	0.0181	**
5 points	-1.6624	-5.2147	-1.3612	0.0425 **	-1.6387	0.0469	**
7 points	-0.2080	-0.7392	-1.6962	0.1444 **	-0.2020	0.0151	**
9 or more points	-0.2632	-0.2503	-1.1624	0.0942 **	-0.2568	0.0202	**

TABLE 4

Regressions for high-point drivers by ticket-point value

In each row, the dependent variable is an indicator that a driver has committed an offence with the stated point value on a particular day. The categories of tickets with 3, 5 and 7 points includes tickets with 6, 10 and 14 points after the policy change, respectively, and the category with 9 or more points includes tickets with all corresponding doubled values after the policy change. All regressions contain age category and demerit point category controls, as well as monthly and weekday indicator variables. The baseline age category comprises drivers under the age of 16. The heading "Sig." is an abbreviation for statistical significance, with the symbol * denoting statistical significance at the 0.1% level and ** the 0.001% level. In the linear probability model, coefficients and heteroskedasticity-robust standard errors are multiplied by 100,000.

	Logistic Regression				Linear Probability Model		
	Marginal Effects AME		Estimate	Standard Error	Sig.	Estimate	Standard Error
Male Drivers (2,618,869,394 observations)							
Model without age-policy interaction:							
Policy	-0.1306	-0.5478	-0.0024	0.0017		-0.2109	0.0905
Model with age-policy interaction:							
Policy	-1.0812	-4.1848	-0.0572	0.0540		-1.8092	1.0215
Age 16-19 * policy	-1.1446	-2.6473	-0.0106	0.0545		-2.9360	1.3097
Age 20-24 * policy	2.0266	4.5628	0.0204	0.0542		-0.1000	1.1226
Age 25-34 * policy	3.2514	8.7684	0.0457	0.0542		1.3441	1.0507
Age 35-44 * policy	2.8733	8.4706	0.0496	0.0542		1.2368	1.0420
Age 45-54 * policy	3.4577	10.9720	0.0698	0.0542		1.9795	1.0375
Age 55-64 * policy	3.5248	12.0052	0.0879	0.0543		2.3344	1.0386
Age 65+ * policy	3.3942	12.9623	0.1316	0.0545		2.7337	1.0342
Female Drivers (2,109,880,942 observations)							
Model without age-policy interaction:							
Policy	-0.1543	-0.8795	-0.0059	0.0027		-0.1803	0.0706
Model with age-policy interaction:							
Policy	0.8415	4.3695	0.1696	0.1874		0.6983	0.9249
Age 16-19 * policy	-6.8789	-26.4519	-0.1940	0.1879		-1.1349	1.0789
Age 20-24 * policy	-6.4219	-23.3417	-0.1686	0.1875		-0.0914	0.9821
Age 25-34 * policy	-5.7121	-22.0027	-0.1848	0.1875		-1.0372	0.9438
Age 35-44 * policy	-5.4912	-21.6223	-0.1970	0.1875		-1.4878	0.9396
Age 45-54 * policy	-3.7063	-15.7414	-0.1681	0.1875		-0.8437	0.9355
Age 55-64 * policy	-2.4244	-11.0054	-0.1496	0.1876		-0.6454	0.9358
Age 65+ * policy	-1.0624	-5.1866	-0.1028	0.1878		-0.3173	0.9345

TABLE 5

Placebo regressions for all offences

For each regression, the dependent variable is an indicator that a driver has committed any offence on a particular day. All regressions contain age category and demerit point category controls, as well as monthly and weekday indicator variables. The baseline age category comprises drivers under the age of 16. The heading "Sig." is an abbreviation for statistical significance, with the symbol * denoting statistical significance at the 0.1% level and ** the 0.001% level. In the linear probability model, coefficients and heteroskedasticity-robust standard errors are multiplied by 100,000.

	Logistic Regression				Linear Probability Model		
	Marginal Effects AME	Estimate MER	Standard Error	Sig.	Estimate	Standard Error	Sig.
Male Drivers (5,335,033,221 observations)							
Policy Indicator	-4.0366	-16.4792	-0.0762	0.0015 **	-4.1859	0.0763	**
Month 1	9.9449	38.5317	0.1483	0.0047 **	8.6823	0.2761	**
Month 2	7.2862	27.2675	0.1110	0.0046 **	6.6386	0.2726	**
Month 3	2.2160	8.3591	0.0380	0.0048 **	2.2264	0.2683	**
Month 4	-4.7201	-17.3888	-0.0965	0.0049 **	-5.0416	0.2534	**
Month 5	-4.1329	-17.4499	-0.0969	0.0052 **	-4.5641	0.2379	**
Month 6	-6.4410	-20.9716	-0.1206	0.0047 **	-6.9509	0.2708	**
Month 7	-4.2653	-14.4849	-0.0782	0.0046 **	-4.4353	0.2648	**
Month 8	-6.3291	-22.5706	-0.1320	0.0049 **	-7.3088	0.2584	**
Month 9	-4.9332	-35.9259	-0.2503	0.0071 **	-6.6876	0.1737	**
Month 10	-10.5940	-44.5275	-0.3699	0.0057 **	-15.3145	0.2167	**
Month 11	-6.2712	-23.1921	-0.1366	0.0051 **	-7.2667	0.2609	**
Month 12	-2.8571	-10.5662	-0.0551	0.0047 **	-3.1070	0.2560	**
Female Drivers (4,340,212,273 observations)							
Policy Indicator	0.8179	4.6888	0.0310	0.0022 **	0.8391	0.0611	**
Month 1	3.7539	19.1217	0.1063	0.0070 **	3.5263	0.2238	**
Month 2	2.1374	10.6644	0.0632	0.0069 **	2.2000	0.2191	**
Month 3	-0.4495	-2.3531	-0.0157	0.0074	-0.3857	0.2112	
Month 4	-3.4773	-18.6622	-0.1527	0.0078 **	-4.0417	0.1945	**
Month 5	-3.2337	-19.8371	-0.1654	0.0083 **	-3.9171	0.1824	**
Month 6	-4.5281	-19.8371	-0.1654	0.0071 **	-4.8207	0.2167	**
Month 7	-3.8277	-17.3447	-0.1390	0.0071 **	-3.9811	0.2116	**
Month 8	-4.5030	-21.4857	-0.1842	0.0074 **	-5.3036	0.2072	**
Month 9	-2.9968	-32.3390	-0.3584	0.0117 **	-5.3165	0.1302	**
Month 10	-6.0362	-37.1693	-0.5268	0.0095 **	-10.3117	0.1611	**
Month 11	-4.3594	-22.6167	-0.1978	0.0080 **	-5.2484	0.2036	**
Month 12	-2.1026	-10.5533	-0.0772	0.0072 **	-2.1935	0.2059	**

TABLE 6

Regressions with indicators for month since policy change

For each regression, the dependent variable is an indicator that a driver has committed any offence on a particular day. All regressions contain age category and demerit point category controls, as well as monthly and weekday indicator variables. The baseline age category comprises drivers under the age of 16. The heading "Sig." is an abbreviation for statistical significance, with the symbol * denoting statistical significance at the 0.1% level and ** the 0.001% level. In the linear probability model, coefficients and heteroskedasticity-robust standard errors are multiplied by 100,000.