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► [Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies.](#)

Wagenaar A.C., Salois M.J., Komro K.A. [Request reprint](#)

**Addiction: 2009, 104, p. 179–190.**

As the UK considers minimum price policies, from an analysis of 112 studies comes the most reliable indication yet that raising the price of alcohol strongly reduces alcohol consumption, including rates of heavy drinking.

**Abstract** On the basis of a systematic review of studies examining relationships between beverage alcohol tax or price levels and alcohol sales or self-reported drinking, the authors concluded that there was a strong inverse relationship, such that as price/tax levels rose, consumption fell.

112 studies of alcohol tax or price effects were found, containing 1003 estimates of the tax/price–consumption relationship. Studies included analyses of alternative outcome measures, varying subgroups of the population, several statistical models, and used different units of analysis. Multiple estimates were coded from each study, along with numerous study characteristics. After taking in to account the impact of other influences, within each study the analysts calculated the **strengths of the correlations** between alcohol price or tax on the one hand, and sales or drinking measures on the other.

Some of the correlations were between price/tax and the aggregate level of consumption across a region or population, others estimated the link in terms of how much individuals drank. In each case, different types of beverages might be analysed separately and/or the study might report total alcohol consumption. A negative correlation means that as price/tax rises, consumption falls; the larger the number, the greater the fall for each unit rise in price or tax. For example, a correlation of -0.5 is a stronger relationship than one of -0.1. Conventionally, correlations exceeding plus or minus 0.24 are considered at least of medium size, and those exceeding 0.37 large. However, even large correlations may occur by chance, so the analysts conducted tests of statistical significance indicating how likely it was that chance variation could account for the figures.

Giving a clearer idea of what these correlations might mean in practice, the analysts also calculated an average elasticity estimate across related studies. A negative elasticity means consumption falls as price rises. For example, an elasticity of -1 means a 10% price rise is associated with a 10% fall in consumption. If consumption had fallen by just 5%, elasticity would have been -0.5. If price rises result in an even greater proportionate drop in consumption, then elasticity is greater than -1. For example, a drop of 15% for a 10% price rise means elasticity is -1.5.

Across all the studies elasticity averaged 0.51, indicating that as price levels rise, consumption falls by about half as much. For beer the corresponding figure was -0.46, wine -0.69, and spirits -0.80.

At the aggregate level (typically across a province or state), all but one of 24 studies found that as price/tax rose, total consumption fell, and in 19 this relationship was statistically significant. Combining these findings yielded a large and highly statistically significant correlation for all types of alcoholic beverage of -0.44. For different beverage types estimates were -0.17 for beer, -0.30 for wine, and -0.29 for spirits, all statistically significant figures.

As expected, at the individual level the added variation due to differences between individuals led to smaller estimates of the link between consumption and price/tax levels, but the evidence remained very strong. For all types of alcoholic beverages the correlation was -0.06, for beer -0.12, wine -0.30, and for spirits -0.10, all statistically significant figures.

Ten individual-level studies specifically reported on the relationship between price and tax levels and heavy drinking. All but one found an inverse relationship and in seven this was statistically significant. Combining results from these studies yielded an average elasticity of -0.28 and a correlation of -0.01 – smaller than the relationship with overall drinking, but still statistically significant.

The authors argued that their analysis provided overwhelming evidence of the effects of alcohol prices on drinking across all types of beverages and across the population of drinkers from light drinkers to heavy drinkers, evidence stronger than for any other preventive intervention and effects larger than most. The implication is that adjusting alcohol tax policies to raise prices of alcohol can achieve substantial prevention benefits at very low cost. However, they also cautioned that the strength of the effect varies across groups, situations and times, perhaps due to variations between communities in income levels, alcohol consumption, meanings and uses of alcoholic beverages, and individual, community and societal influences on drinking behaviour.

## FINDINGS

A [commentary](#) published alongside the featured study reminds readers that price or tax rises have been directly linked to falls in drink-related adverse consequences such as deaths from various causes, violence, traffic and other accidents, and poor health. A UK [analysis](#) commissioned by the Department of Health has linked these elements together to estimate the harm reduction impact of various price and tax policies. Scotland is [planning](#) to act on such evidence by setting a minimum price for a unit of alcohol and banning the sale of alcohol as a loss-leader. Though the UK government's principal medical adviser has [strongly recommended](#) a similar policy, the rest of the UK [seems unlikely](#) to follow Scotland's example. The [commentary](#) to the

featured study argues that the current economic downturn might provide further motivation for governments to raise taxes, but the reverse is also being argued – that a time when the population is having to tighten its belt is not the time to dramatically raise drink prices.

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