Applying a ‘Chain Goods Solution’ to Decisions to Fund R&D in the Australian Wine Value Chain

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Abstract

We assess the practicality of applying a ‘chain goods solution’ to internalise positive externalities through R&D in the Australian wine value chain. The aims are: to examine the conditions under which public, chain or private funding of R&D in wine value chains is to be preferred; and to discuss issues relating to the distribution of the costs of, and returns to, R&D among wine value chain participants. A common argument for public funding of research focuses on positive externalities: there is a risk that socially desirable projects will not be funded. The funding of research through collective action aims to correct this error and fill the research funding gap. An alternate argument is that if a sufficient number of members of the value chain join forces and their joint benefits exceed the cost of R&D, a socially desirable project will be funded even if the chain members do not capture all the benefits. Potential problems with this solution are then canvassed and assessed.

The rationales for public funding and chain goods solution to wine R&D in Australia are compared by examining Type 1 errors (socially desirable projects will not be funded) and Type 2 errors (socially undesirable projects will be funded). A simple analytical framework for funding is adopted by considering who benefits from R&D in wine value chains and what determines the rate of internalisation of the positive externalities of R&D. Our analysis is initially based on the principles enunciated by Swann (2003), with the substitution of ‘value chains’ for ‘clubs’ and ‘chain goods’ for ‘club goods’ reflecting the fact that research in a value chain is an important chain good (a good in the value chain with club attributes).

The ‘chain goods solution’ has a role in funding applied research activity, in particular. Swann (2003) observed that a common ‘club goods’ response to the externality argument is to ask why the diverse beneficiaries from a research project cannot fund it. Or in the current context: Why can’t members of the wine value chain form a ‘club’ to fund R&D within it? If a sufficient number of members join forces such that their joint benefits exceed cost, the socially desirable project will be funded even if the ‘club’ that is formed does not capture all the benefits. In this way the chain goods solution complements the private and public finance solutions, and where the boundary lies between public funding, private funding and a chain goods solution depends in large part on the ease with which the R&D benefits can be internalised within a value chain. Public funding is required where socially valuable projects do not appear to be profitable to members of the chain as a whole or to private members within the chain.
Beyond the Type 1 and Type 2 errors, comparing the suitability of a chain goods solution with the public finance solution entails an evaluation of transaction costs, economic efficiency, equity, risk of monopolisation and the rate of internalisation. Transaction costs discourage the expansion of membership for a research project as it can be costly tracking down all beneficiaries from spillovers and charging them for the benefits they receive. In terms of efficiency and equity, there are the risks of free riding whereby a large number of externalities evade research levies and forced riding where chain members with market power impose unsuitable research activities on less powerful members.

The risk of monopolisation occurs when chain members conduct R&D to prevent the entry of new firms into the wine industry by using the market power of the chain and extracting rents from exclusive control of their intellectual property. If research activities and benefits are not freely available to current and future chain participants, total research effort and value chain competition may be eroded.

The rate of internalisation depends on the joint distribution of chain (and private) benefits and externalities from R&D. In practice, the rate of internalisation tends to be highly variable across basic research projects and there is no clear positive correlation between internal and external benefits (Swann 2003). For applied research projects, the rate of internalisation varies in the wine value chains depending in large part on whether the diffusion of benefits from R&D follows an epidemic or probit diffusion process (Swann 2003). Wine value chains are likely to correspond more to an epidemic diffusion process in which it is possible to map the stakeholders in the chain and the flow of product between them, and to track changes in value added at each stage. Appropriation of funds from chain beneficiaries could be made by levying members according to their changes in value added, but this process may not be easy in all circumstances.

The distribution of benefits from wine R&D is deeply influenced by the structure of the wine value chain, particularly the large number of suppliers of raw materials – vineyards producing winegrapes – and the concentrated winemaking stage, dominated by major brands, and highly concentrated retail stage, dominated by the major supermarket firms. Vineyards might not benefit greatly from research outcomes in the value chain if the grapes they supply to it are demand-inelastic. If winegrapes are price-inelastic, technical change within the chain could decrease the rents to the scarce resources in grape production. If they are price-elastic (as for many wine exports) and research benefits are public, they are likely to be competed away and
not greatly benefit the original investors in research activity. If the introduction of new technologies along the chain leads to the wine becoming more income-elastic in demand relative to the grapes, vineyards would not receive much of the benefit from increased demand as consumers’ incomes increase in the future. Value chain research might therefore be counterproductive from a private vineyard’s viewpoint. In sum, the internalisation of R&D externalities will be a challenge while trying to keep transaction costs low.

Reference

Swann, G.S.P. 2003, ‘Funding basic research: when is public finance preferable to attainable “club goods” solutions?’, in A. Geuna, A.J. Salter and W.E. Steinmuller (eds), Science and Innovation: Rethinking the Rationales for Funding and Governance, Edward Elgar, Cheltenham.

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