Matching grants

Definition − A grant that ties the amount of funds being transferred to the local community to the amount of spending it currently allocates to public goods.

<div align="right">Source: Gruber, J. (2016) Public Finance & Public Policy</div>

Intuition − In order to create a more equal distribution of resources between wealthier and poorer communities, one government entity may transfer money to another. One type of intergovernmental transfer is a matching grant which ties the transfer amounts to spending levels by the receiving entity. This type of transfer essentially makes spending in the targeted area cheaper because a portion of the funding is provided by a 3rd party. This creates an incentive for the receiving party to increase overall consumption in the targeted area.

Mathematical / Technical

- Matching grants provide a relative factor of the amount of money a community is going to spend, which is expressed as a ratio, N:1. In an N:1 matching grant the community receives N dollars for every 1 dollar they spend.

- An N:1 matching grant effectively reduces the price of the project to $\frac{1}{N+1}$, because for every N dollar that is spent, 1 dollar will be received.

- Per the law of demand, as price goes down, quantity demanded goes up.

- As quantity demanded increases, the recipient attains a higher level of utility.

- To find the levels of X and Y, perform a utility maximizations. Note that prices are implicitly $1 before the transfer, as X and Y stand for the amount spent:

  Before Transfer → $\frac{MU_X}{MU_Y} = 1$; X + Y = Spending

  After Transfer → $\frac{MU_X}{MU_Y} = \left(\frac{1}{N+1}\right) * 1$;

  $\left(\frac{1}{N+1}\right)X + Y$ = Spending

- For example, a 1:1 matching grant for good X, treat the price of good X as ½.

- The effect of this price change can be decomposed to the income and substitution effects which demonstrate that as the relative affordability of a good increases, consumption increases as a result of of feeling richer.

- Relative consumption is used in lieu of an actual price for the goods being compared. This necessitates the use of a price ratio of 1 prior to the transfer.

- Using the system of equations above, find the new price of X and use that to determine new levels of consumption for X and Y given a constant level of spending.

- The amount spent on Y may change too; this depends on cross-price elasticity: if it increases, Y is a complement to X, if it decreases, a substitute. No change implies unrelated spending.

Graphical − 1:1 Matching Grant
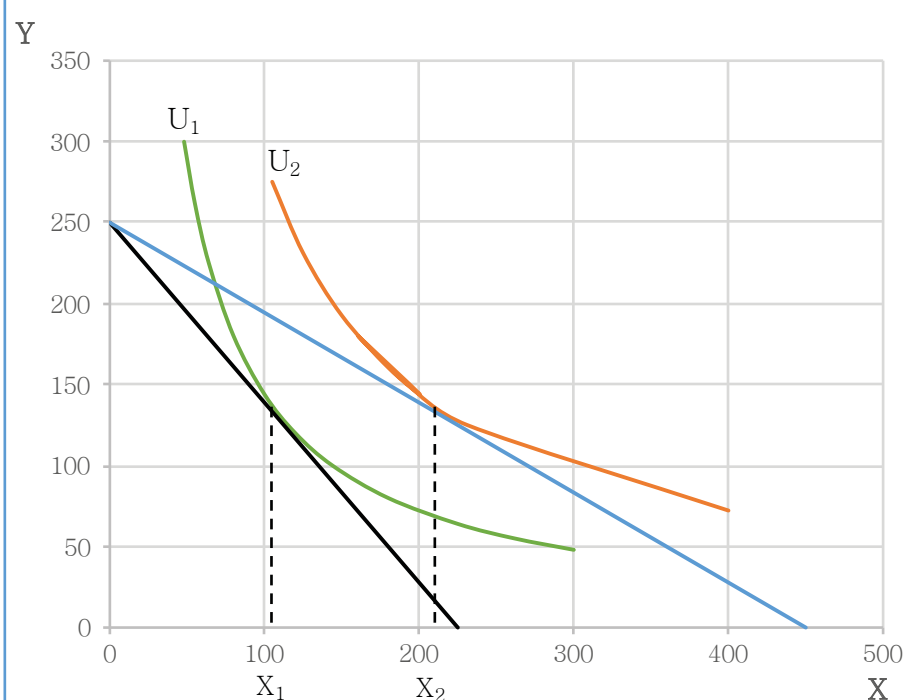
The black line represents the original budget constraint. Original consumption is marked by X_1. Then, a 1:1 matching grant for good X is received which swings the budget line, this demonstrates the increased relative affordability. New consumption is marked by X_2

Real−world aspects − School finance equalization laws are highly relevant examples of these types of government transfers. Public education spending is generally funded by property taxes in a given school district. States like New Jersey provide matching grants for neighborhoods without high priced homes which ensures lower income areas have education funding that is on par with higher income areas.[a] The federal government also uses matching grants in the US Highway System. They generally match 70% of state expenditures on highways. Matching grants have been used for US highway funding since 1921.[b]

<div align="right">Sources: [a] Gruber, J. (2016) <i>Public Economics and Finance</i>. [b] Miller, Edward (1974) <i>The Economics of Matching Grants: The ABC Highway Program.</i></div>

Practice Questions

1. If a town originally consumes $300 worth of good *X* before the matching grant is provided and consumes $400 worth of good *X* after the matching grant is provided what is the ratio of the matching grant? Explain the reasoning behind the extra $100 worth of consumption.

2. Explain the importance of matching grants in school finance equalization laws. Why is there a need for such grants? What are the benefits of such grants?

3. Denver has a utility function $U(X,Y) = X^{\frac{1}{2}}Y^{\frac{1}{2}}$ and a budget of $1,000 to spend on both goods.
   A. What is the initial level of consumption of both goods?
   B. What is the new level of consumption given a 3:1 matching grant for good X?

Numerical solutions: **1.** 1:3 ; **3A.** 500 and 500 ; **3B.** $X = 666.66$ and $Y = 222.2$.