

National Bank Notes Are Second Derivatives

There is a special relationship between a function and its derivative. The derivative is the “child” of its “parent” function. There was a time when the paper money that circulated in our nation was a derivative. The paper money was “backed” by gold or silver. It had value because it could be exchanged for gold or silver coins. The paper money was a financial derivative of the metallic money.

The gold certificates and silver certificates in circulation a hundred years ago carried obligations stating they could be redeemed in gold or silver.



“In Gold Coin Payable To The Bearer On Demand”

The figure suggests the derivative relation between a \$20 gold certificate and its parent \$20 gold coin.

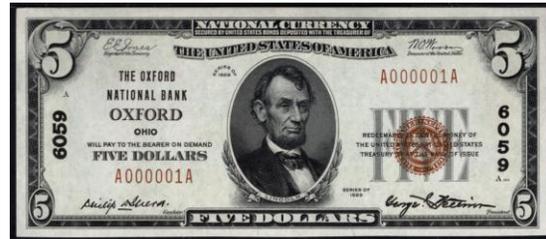


Second Derivatives

Scientists and mathematicians often use the derivative of a derivative – a so-called “second” derivative. For example, physicists use position, velocity and acceleration to describe the motion of a particle. Velocity is the derivative of position and acceleration is the derivative of velocity. This means that acceleration is the second derivative of position – the derivative of the derivative of position.

Financial second derivatives are also encountered. National Bank Notes are popular among collectors of paper money. Let’s see what makes them second derivatives.

The figure shows a \$5 note issued to the Oxford National Bank located in Oxford, Ohio.



National Bank notes were secured by US Treasury Bonds. The banker purchased the bonds and deposited them with the United States Treasury as security for the notes they received. Here’s a scenario which shows the derivatives involved:

Banker uses gold coins to buy U S Treasury Bonds
Banker deposits bonds with US Treasurer.
Banker receives National Bank notes.

The Treasury Bonds are the first derivative.

$$\text{Bond} = d(\text{Gold})/d\$$$

The National Bank notes are the second derivative.

$$\text{National Bank notes} = d(\text{Bonds})/d\$$$

Each derivative draws its value from an underlying asset: Bond from Gold, Note from Bond

Being second in this sequence makes National Bank notes second derivatives. Here’s a \$5 National Bank note from the Farmers National Gold Bank of San Jose, California. It’s value was linked to gold coins through the US Treasury Bonds purchased by the bank.

