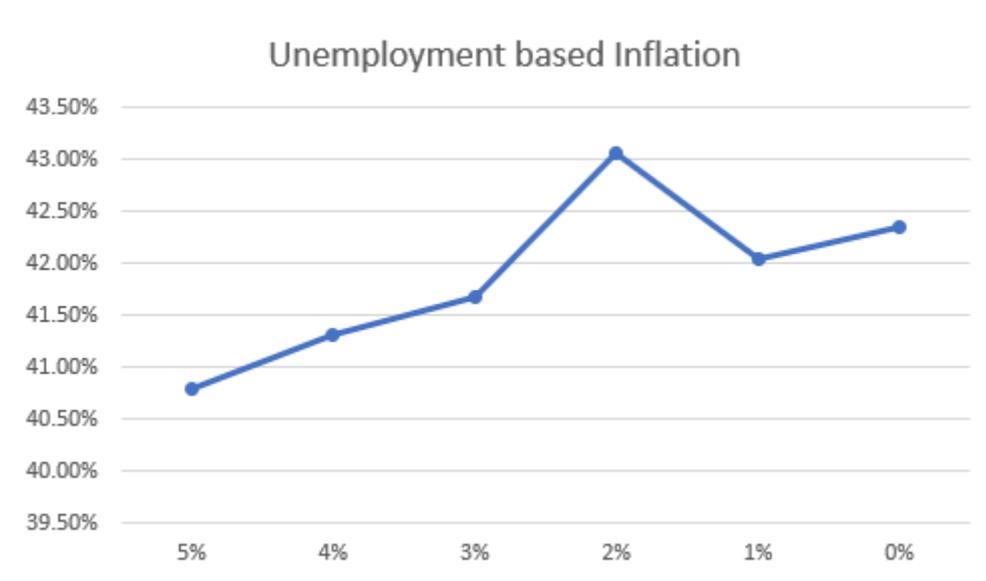
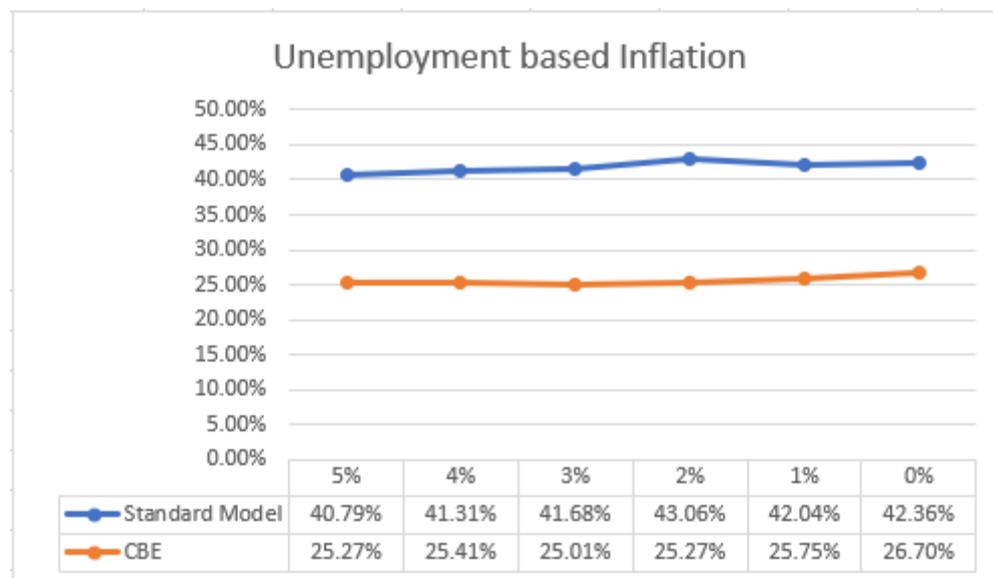


Graph 1. Inflation caused at various levels of unemployment*



Graph 2. Inflation caused at various levels of unemployment, plotting normal levels and CBE levels*



WHAT IS IT?

This model demonstrates a very simple bidding market, where buyers and sellers try to get the best price for goods in a competitive setting.

HOW IT WORKS

The agents in the inner ring of represent sellers, who bring some goods they want to sell to the market. The agents in the outer ring are the buyers, who bring money to the market to buy the goods.

Each round (tick), the buyers move to their right (counterclockwise) and are paired with a seller. Then each buyer checks its paired seller's asking price. If it is lower than their asking-price, they will buy 1 item. If it is higher, they'll buy nothing. Then each seller individually decides to either raise prices or lower prices based on their buyer's behaviour. The buyers also individually lower or raise their expectations based on their seller's behaviour.

The market will run through rounds until no buyer who wants to buy an item has money left to spend, or until all items are bought.

PURCHASE DISPLAY

If a purchase is made, the link from seller to buyer turns yellow and a little star animation will start. Otherwise, the link will be blue with no animation. If the transactions still take place too quickly to be noticed, the speed slider can slow the model down a bit.

As buyers get what they want, they get bigger and fill their maximum-buy-sized gray shadow. If they fully satisfy their demand, they will turn dark grey.

Sellers start with a size based on how many items they brought to the market. As they sell items, they get smaller. If they sell all their items, they will turn dark grey.

COUNTERBALANCE ECONOMICS (CBE) MODEL EXTENSION

The Counterbalance Economics model is the name of an alternative economic system which aims to reduce the level of inequality in any given population.

The Bidding Market ABM is a companion model to the Wealth Distribution model. They have both been modified to incorporate the key elements of the Counterbalance Economics model which include:

1. Paying the lowest paid workers, the AWE (Average Weekly Earnings) or Average total Wealth in this model
2. Paying the lowest 50% of workers does not reduce the amount of grain available, to simulate paying those workers with Contra-deal credits
3. This also simulates how the Counterbalance model fixes supply shortages without damaging the environment

Note: The Counterbalance Economics model reduces inequality to almost zero, which means there is no poverty while still allowing the rich to remain rich.

The outcomes achieved by the CBE model are done by complementing the economic system being used in any country. Although it is theoretically possible to run the CBE autonomously, it is not designed to work independently but rather with the existing system of any economy.

DIFFERENCES

The Wealth Distribution of ABM allows us to simulate any global economy and compare that to the existing economic system. It then allows us to see what would happen to individual and community wealth along with the level of inequality with the addition of the CBE to that economic system. As mentioned, the CBE provides a job for everyone who wants one however, if we tried to do that without implementing the CBE it would create strong inflationary pressures which would not be good for the economy. We have therefore modified The Bidding Market ABM to test the inflationary pressures caused by providing various levels of employment both with and without the CBE.

Current Economic doctrine dictates that an economy has reached the level of “full employment” when the rate of unemployment has reached approximately 5% (This varies from country to country). For more information about the concept of “full employment” and the

CBE system, please go to www.UrReferendum.org.au

To test the level of inflation we have added the following controls and monitors:

Num-of-employees (slider) – Allows us to vary the number of employees from 50 to 10,000

Num-employees-needed (slider) – Allows us to vary the number of employees needed

Starting-money (slider) – Allows us to vary the amount of money employers have to spend on wages

Wage Willing to Pay \$ (monitor) – Displays the amount of wages employers are willing to pay and employees are willing to accept (Employment only occurs when both parties agree on a price)

Percent-money-taken (monitor) – Displays the % of money employers have spent to attract employees

Unemployed (monitor) – Displays the number of unemployed

% unemployed (monitor) – Displays the unemployment level as a percentage

HOW TO USE IT

Press SETUP to generate a market, then the GO-ONCE button to run a single round, or the

GO button to run the market until it completes.

- Behavior is set when SETUP is run and can be set to one of a few options (the description given is for buyers, but mirrored for sellers):
 - o Normal - buyers will increase their willing to pay by a small amount if they are unable to make a purchase, otherwise they will lower their willing-to-pay if they do manage to buy an item.
 - o Desperate - increases the amount buyers will increase their willing-to-pay when they fail to make a purchase.
 - o Random - the behaviour of each buyer will be random - some will be very desperate; others might decrease the amount they are willing-to-pay when they fail to make a purchase.
 - o Mix of all - each buyer will be set to one of the three above behaviours randomly.
- You can also toggle whether sellers will consider full buyers or not. A full buyer is one who has already satisfied their demand. This would simulate the sellers being able to tell who is walking past their market stall without even looking at the items' prices.

TESTING INFLATIONARY PRESSURES

To test the inflationary pressure caused we used the BehaviourSpace tool to run the model 500 times with a 5% unemployment rate down to 0% unemployment rate. We saved this data and plotted it on graph 1.

Graph 1. Inflation caused at various levels of unemployment*

(for a summary of information please email Peter@UrReferendum.org.au)

We then ran the tests again however this time we reduced the number of employees by 50% (100) and the number of employees needed down to 95, 96, 97, 98, 99 and 100 to simulate the reduction of unemployment from 5% to 0%. However, this time we left the amount of money available to spend on wages at the same level. This simulates the implementation of the CBE as approximately half of the workforce (the lower half), would join the CBE system of payment which reduces the number of employees available and the number of employees required without reducing the amount businesses have to spend on wages.

After running this new set of simulations 500 times each, we save the data a plotted both sets of data in graph 2.

Graph 2. Inflation caused at various levels of unemployment, plotting normal levels and CBE levels*
(for a summary of information please email Peter@UrReferendum.org.au)

CBE COMPARISON SUMMARY

As discussed, the Bidding Market ABM was modified to test the inflationary pressures caused by reducing the level of unemployment from 5% down to 0% firstly by allowing the standard market forces to prevail (standard model) and then introducing the CBE system and comparing the difference. The standard model exhibited a large inflationary rate increase of between 40.79 to 42.36%, while the CBE model exhibited a much lower inflationary rate increase of between 25.27 to 26.70% which is a reduction or around 39%.

Although the Bidding Market model is not designed to model inflation, it is designed to simulate market forces and the level of employment is subject to the same forces, namely supply and demand, along with the amount of wealth in the economy (Hubbard, p190).

To summarize, the model has shown that implementing the CBE would significantly reduce any inflationary pressures caused by reducing the unemployment rate down from 5% to 0%.

Based on the results, introducing the CBE into the Australian, UK or US economies would increase the overall wealth of those countries by around 492% and the level of inequality would be reduced from an average of .384 down to an average of .07. Further research will be conducted including a pilot to test the robustness of the results achieved in the simulation.

THINGS TO NOTICE

Try slowing the tick speed down and watching a single buyer on the outside ring as it moves. See how it gets bigger when it makes a purchase, and its link turns yellow, and how big it is when it turns completely dark grey (if it does).

Run the model multiple times with the same settings to get an idea of what is happening to the asking and buying prices over time.

THINGS TO TRY

Play around with the different setup options to try the following:

- Can you get to 100% of both items sold and demand satisfied? If not, how close can you get?
- What is the longest you can get a market to run for (in number of ticks)?
- What is the highest average price you can get at the end of a round?
- Sometimes the market stops when there are buyers on the outside ring who still want to purchase things (% Demand Satisfied is not 100%) and there is still money available to spend (% Money Taken is not 100%). How this can be?

EXTENDING THE MODEL

It's fairly easy to add new behaviours to buyers and sellers, just adjust the chooser box with a new option, then add it in the appropriate create-ordered-sellers or create-ordered-buyers block in the setup procedure.

NETLOGO FEATURES

In order to keep the Asking Price and Buying Price plots displaying relevant information, we set the plot-y-range manually using an update command based on the most recent average price.

Behaviours for buyers and sellers are set during setup, and we use anonymous procedures stored in turtles-own variables. This allows us to very easily execute different behaviour while the market is running by just using the run keyword with those behaviour variables.

RELATED MODELS

See the Simple Economy model or Sugarscape models to explore other economic concepts.

HOW TO CITE

If you mention this model or the NetLogo software in a publication, we ask that you include the citations below.

For the model itself:

- Baker, J. and Wilensky, U. (2017). NetLogo Bidding Market model. <http://ccl.northwestern.edu/netlogo/models/BiddingMarket>. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.

Please cite the NetLogo software as:

- Wilensky, U. (1999). NetLogo. <http://ccl.northwestern.edu/netlogo/>. Center for Connected Learning and Computer-Based Modeling, Northwestern University, Evanston, IL.

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- Note that this is simulating the inflation that would be caused by employing everyone who wanted a job. What the simulation demonstrates is the massive reduction of inflationary pressure between the standard economic systems and then adding the CBE model.