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# THE PAPER TITLE<sup>\*</sup>

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**Your Name<sup>†</sup>**  
Department of Economics

2022

## ABSTRACT

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**Keywords:** keyword 1, keyword 2

**JEL Codes:** J02, R10

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<sup>\*</sup>We thank someone for excellent research assistance. We thank someone for their comments and suggestions.

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# 1 Introduction

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# 2 Model

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**Theorem 1** (Envelope Theorem). *Only the direct effects of a change in an exogenous variable need be considered, even though the exogenous variable may enter the maximum value function indirectly as part of the solution to the endogenous choice variables. The proof is in Appendix B.*

The **competition** can be illustrated with the following graph with the implementation is presented in Listing 1:

Figure 1: This is a graph



*Note:* some notes. The graph should be self-contained. Etiam vel ipsum. Morbi facilisis vestibulum nisl. Praesent cursus laoreet felis. Integer adipiscing pretium orci. Nulla facilisi. Quisque posuere bibendum purus. Nulla quam mauris, cursus eget, convallis ac, molestie non, enim. Aliquam congue. Quisque sagittis nonummy sapien. Proin molestie sem vitae urna. Maecenas lorem. Vivamus viverra consequat enim.

### 3 Comparative Statics

This is also demonstrated in Figure 1 and the results are presented in Appendix B.1b. Download this template at the [Github repository](#).

Listing 1: Long short-term memory

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```

1 class network_LSTM(nn.Module):
2     def __init__(self, input_size=1, hidden_size=256, output_size=1):
3         super().__init__()
4         self.hidden_size = hidden_size
5         self.lstm = nn.LSTM(input_size, hidden_size)
6
7         # fully-connected
8         self.linear = nn.Linear(hidden_size, output_size)
9
10        self.hidden = (
11            torch.zeros(1, 1, self.hidden_size),
12            torch.zeros(1, 1, self.hidden_size)
13        )
14
15    def forward(self, vec):
16        lstm_output, self.hidden = self.lstm(vec.view(len(vec), 1, -1), self.hidden)
17        prediction = self.linear(lstm_output.view(len(vec), -1))
18        return prediction[-1]
```

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## 4 Empirical Results

We follow the approach from [Harding and Lamarche \(2019\)](#). Quisque facilisis auctor sapien. Pellentesque gravida hendrerit lectus. Mauris rutrum sodales sapien. Fusce hendrerit sem vel lorem. Integer pellentesque massa vel augue. Integer elit tortor, feugiat quis, sagittis et, ornare non, lacus. Vestibulum posuere pellentesque eros. Quisque venenatis ipsum dictum nulla. Aliquam quis quam non metus eleifend interdum. Nam eget sapien ac mauris malesuada adipiscing. Etiam eleifend neque sed quam. Nulla facilisi. Proin a ligula. Sed id dui eu nibh egestas tincidunt. Suspendisse arcu.

By using this approach, comparable results can be obtained ([Chen, Esteban and Shum, 2013](#)). To calculate the ELBO<sup>3</sup>, we start from using the property of the KL-divergence. The data can be summarized by the tables with decimal alignment below:

Table B.1a: First Table

Category	Total	Shares (%)	Female	Male	Asian	Black/AA	His./Latino	White/Cau.	Zeros (%)
child care	19.39	0.08	12.32	20.12	23.14	63.78	20.24	19.00	0.07
eating	30.35	6.12	35.97	6.23	24.61	21.58	38.18	2.02	0.00
education	9.91	0.04	9.94	90.54	9.69	7.99	10.64	10.14	0.90
entertainment (not TV)	26.05	0.10	29.19	26.60	33.36	26.13	4.43	25.15	0.45

*Note:* This is the first table.

Table B.1b: Second Table

Category	Total	Shares (%)	Female	Male	Asian	Black/AA	His./Latino	White/Cau.	Zeros (%)
child care	19.39	0.08	39.32	40.12	23.14	18.78	20.24	19.00	0.07
personal care	13.92	0.06	24.00	23.14	16.12	1.76	15.15	13.66	0.00
sports/exercise	20.44	0.08	20.38	31.00	24.99	25.48	20.71	20.07	0.53
TV	28.61	0.12	48.47	9.93	2.35	63.70	29.22	80.20	0.46

*Note:* This is the second table.

<sup>3</sup>More information about the evidence lower bound (ELBO) can be found on the [Wikipedia](#).

## 5 Algorithm

In the following, we present the algorithm:

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**Algorithm 1:** Euclid’s algorithm for finding the greatest common divisor of two nonnegative integers

---

function **Euclid** ( $a, b$ );

**Input** : Two nonnegative integers  $a$  and  $b$

**Output** :  $\gcd(a, b)$

**if**  $b = 0$  **then**

    return  $a$ ;

**else**

    return **Euclid**( $b, a \bmod b$ );

**end**

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Table 2: Summary Statistics

	Cohort		
	2006	2007	2008
<b>Students registered</b>	1535	1584	1767
<b>Gender (%)</b>			
Male	61.1	64.5	57.7
Female	38.9	35.5	42.3
<b>Race (%)</b>			
White	43.3	43.4	40.6
Black	29.8	33.4	34.8

*Note:* Source: UCT Institutional Planning Department.

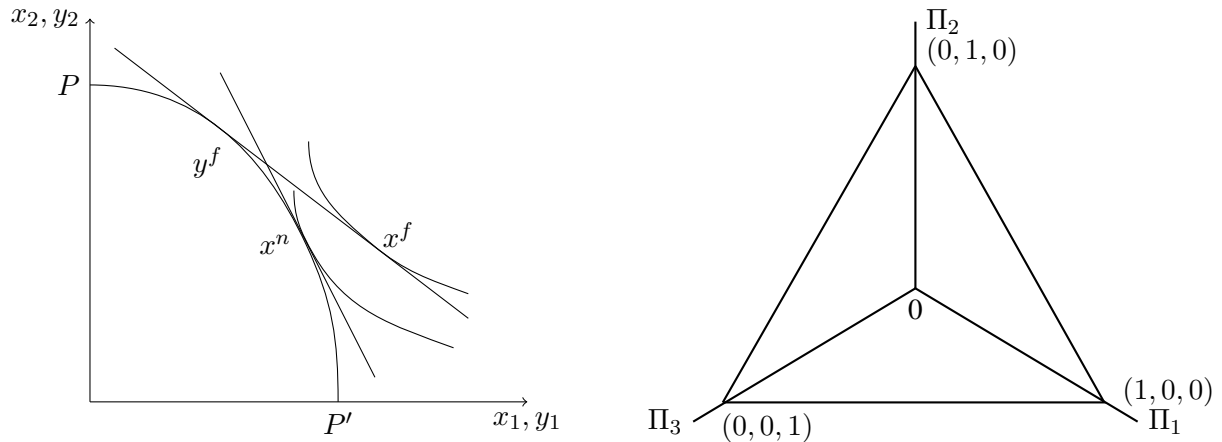
## 6 Conclusion

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We graph with `tikz` in `LATEX`:



## References

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# Appendices

## A Additional Discussion

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## B Proof of Theorem 1

We will proof the following equation:

*Proof.* Given  $y, x, \Delta, \nu, \eta, \mathcal{L} = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 4 & 5 & 6 & 7 \end{pmatrix}$ , and  $\Pi = \begin{vmatrix} A & B & C \\ D & E & F \end{vmatrix}$ , if

$$\begin{cases} \text{trade,} & p(\text{trade}) = \frac{y}{v} \\ \text{no trade,} & p(\text{no trade}) = 1 - \frac{y}{v} \end{cases}$$

then we get the following:

$$\begin{aligned} y &= \mathbb{E}_{\pi}(\beta x + \epsilon) \\ &\neq \sum_i \beta_i (\underbrace{\alpha + \xi}_{\text{variables}}) + \epsilon \end{aligned} \tag{1}$$

$$\implies \int_0^{10} r \left( \frac{r}{50} \right) dr \xrightarrow{\text{text here}} \frac{r^3}{150} \Big|_0^{10}, \forall x \in (a, b) \tag{2}$$

So from  $\widehat{ABCD}$ ,  $\widetilde{ABCD}$ ,  $\widehat{ABCD}$ ,  $\overrightarrow{ABCD}$ , and  $\overline{ABCD}$ , we get the desire result. ■

Consider  $g(x) = f(x) - x$ , since  $f(x)$  and  $x$  are continuous, then  $g : [a, b] \rightarrow \mathbb{R}$  is continuous. Then

$$g(a) = f(a) - a > 0, \quad g(b) = f(b) - b < 0$$

By IVT:  $\exists c \in (a, b)$  s.t.  $g(c) = 0 \implies \exists c \in (a, b)$  s.t.  $f(c) - c = 0 \implies f(c) = c$ .