

Step-by-Step Transition-Based Dependency Parsing

"Economic news had little effect on financial markets."

Introduction

- ▶ We analyze the sentence: "**Economic news had little effect on financial markets .**"
- ▶ We use a transition-based dependency parser.
- ▶ Three key actions:
 - ▶ **SHIFT**: Move a word from the buffer to the stack.
 - ▶ **LEFT-ARC**: Make the second-top element of the stack dependent on the top element.
 - ▶ **RIGHT-ARC**: Make the top element of the stack dependent on the second-top element.

Step 0: Initial configuration

Transition:

- ▶ **Stack:** [ROOT]
- ▶ **Buffer:** [Economic, news, had, little, effect, on, financial, markets, .]

Economic news had little effect on financial markets .

Step 1: SHIFT

Transition: Move "Economic" from buffer to stack.

- ▶ **Stack:** [ROOT, Economic]
- ▶ **Buffer:** [news, had, little, effect, on, financial, markets, .]

Economic news had little effect on financial markets .

Step 2: SHIFT

Transition: Move "news" from buffer to stack.


- ▶ **Stack:** [ROOT, Economic, news]
- ▶ **Buffer:** [had, little, effect, on, financial, markets, .]

Economic news had little effect on financial markets .

Step 3: LEFT-ARC (ATT)

Transition: "Economic" modifies "news" (ATT - Attribute).
Remove "Economic".


- ▶ **Stack:** [ROOT, news]
- ▶ **Buffer:** [had, little, effect, on, financial, markets, .]

The diagram shows the sentence "Economic news had little effect on financial markets ." with an arc labeled "ATT" connecting the word "Economic" to the word "news".
Economic news had little effect on financial markets .

Step 4: SHIFT

Transition: Move "had" from buffer to stack.

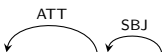
- ▶ **Stack:** [ROOT, news, had]
- ▶ **Buffer:** [little, effect, on, financial, markets, .]


Economic news had little effect on financial markets .

Step 5: LEFT-ARC (SBJ)

Transition: "news" is the subject of "had" (SBJ - Subject).
Remove "news".

- ▶ **Stack:** [ROOT, had]
- ▶ **Buffer:** [little, effect, on, financial, markets, .]

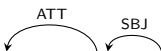


Economic news had little effect on financial markets .

Step 6: SHIFT

Transition: Move "little" from buffer to stack.

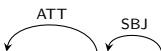
- ▶ **Stack:** [ROOT, had, little]
- ▶ **Buffer:** [effect, on, financial, markets, .]


Economic news had little effect on financial markets .

Step 7: SHIFT

Transition: Move "effect" from buffer to stack.

- ▶ **Stack:** [ROOT, had, little, effect]
- ▶ **Buffer:** [on, financial, markets, .]



Economic news had little effect on financial markets .

Step 8: LEFT-ARC (ATT)

Transition: "little" modifies "effect" (ATT - Attribute). Remove "little".

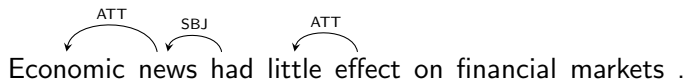
- ▶ **Stack:** [ROOT, had, effect]
- ▶ **Buffer:** [on, financial, markets, .]

Economic news had little effect on financial markets .

Step 9: SHIFT

Transition: Move "on" from buffer to stack.


- ▶ **Stack:** [ROOT, had, effect, on]
- ▶ **Buffer:** [financial, markets, .]



Step 10: SHIFT

Transition: Move "financial" from buffer to stack.

- ▶ **Stack:** [ROOT, had, effect, on, financial]
- ▶ **Buffer:** [markets, .]

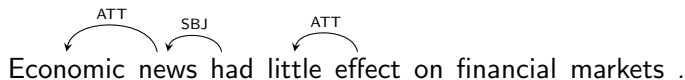


Economic news had little effect on financial markets .

Step 11: SHIFT

Transition: Move "markets" from buffer to stack.

- ▶ **Stack:** [ROOT, had, effect, on, financial, markets]
- ▶ **Buffer:** [.]



Step 12: LEFT-ARC (ATT)

Transition: "financial" modifies "markets" (ATT - Attribute).
Remove "financial".

► **Stack:** [ROOT, had, effect, on, markets]

► **Buffer:** [.]

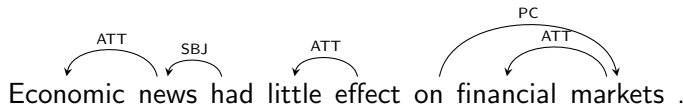
Economic news had little effect on financial markets .

The diagram illustrates the LEFT-ARC (ATT) transition. It shows the sentence "Economic news had little effect on financial markets ." with four curved arrows above it, each labeled "ATT". The arrows point from the word "financial" to the words "news", "effect", "on", and "markets", indicating that "financial" is being removed as an attribute of each of these words.

Step 13: RIGHT-ARC (PC)

Transition: "on" is a prepositional complement of "markets".
Remove "markets".

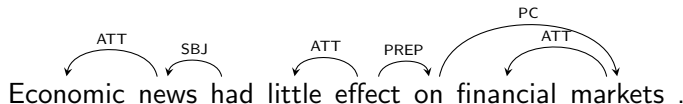
- ▶ **Stack:** [ROOT, had, effect, on]
- ▶ **Buffer:** [.]



Step 14: RIGHT-ARC (PREP)

Transition: "on" functions as a preposition modifying 'effect' (PREP - Preposition). Remove "on".

- ▶ **Stack:** [ROOT, had, effect]
- ▶ **Buffer:** [.]

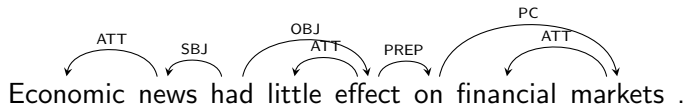


Step 15: RIGHT-ARC (OBJ)

Transition: "had" takes "effect" as its object (OBJ - Object).
Remove "effect".

► **Stack:** [ROOT, had]

► **Buffer:** [.]

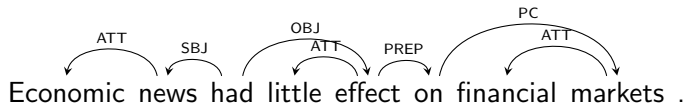


Step 16: SHIFT

Transition: Move "." from buffer to stack.

► **Stack:** [ROOT, had, .]

► **Buffer:** []

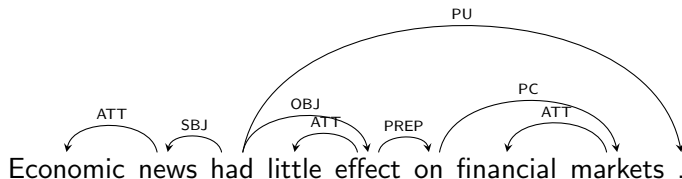


Step 17: RIGHT-ARC (PU)

Transition: "had" takes "." as punctuation (PU). Remove ".".

► **Stack:** [ROOT, had]

► **Buffer:** []



Step 18: RIGHT-ARC (PRED)

Transition: "ROOT" takes 'had' as predicate (PRED). Remove 'had'."

► **Stack:** [ROOT]

► **Buffer:** []

