1. Introduction

Principles of economy have been considered an essential part of grammar in the Minimalist Program. Fox’s original contribution is his postulation that the application of covert operations is constrained by economy considerations just as are overt operations. Departing from the modularity hypothesis, he suggests that syntactic operations are conditioned by semantic information.\(^1\) He proposes that scope shifting operations and non-local variable binding apply only when they affect the interpretation of a sentence. He also argues that the operator-variable construction is formed from a chain with the least change in the structure required to obtain a designated interpretation. Fox introduces sets of new data and new ways of looking at familiar data to support his view. The exceptionally clear analyses enable us to better understand the nature and system of the syntax-semantics interface.

The book collects materials discussed in Fox’s recently published papers (Fox (1995a, b) (1998a, b) (1999a, b)). Connecting the ideas in...
his earlier papers, Fox gives a general picture of operations in the Logical Form component.

In this article, I will outline three economy principles that Fox proposes: Scope Economy, VB Economy and OV Economy. Then I will discuss some details of his proposals that require clarification or modification.

2. Scope Economy

The first economy principle proposed in the book is Scope Economy: Scope shifting operations are prohibited if their application is semantically vacuous. Let us focus on QR in this section. We will discuss QL and Scope Economy in section 5.1.

Fox assumes two types of quantifier-raising operations. One is obligatory to match a semantic requirement (cf. Heim and Kratzer (1998)). The object QP has to be raised to a VP adjoined position to resolve a type mismatch. The other kind is optional, but restricted by Scope Economy and Shortest Move. A QP adjoins to the nearest proposition-denoting category (VP, IP, and CP) when its movement leads to a change in the interpretation of a sentence.

The following examples illustrate how Scope Economy works. In (1), 'every teacher' can be moved across 'a boy' since the reversed scope order obtained by (the optional) QR gives an interpretation different from the one resulting from the surface scope order.

(1) a. A boy admires every teacher. (p. 30)
   b. [IP a boy1 ... [VP every teacher2 [VP t1 admires t2]]] \( \exists > \forall 
   c. [IP every teacher2 [IP a boy1 ... [VP t'2 [VP t1 admires t2]]] \( \forall > \exists 

In (2) and (3), 'every teacher' cannot be raised over the subject since there will be no change in the meaning resulting from movement.

(2) John admires every teacher. (p. 20)
(3) Every boy admires every teacher. (ibid.)

We cannot confirm whether Scope Economy really works and blocks QR since the two scopal relationships of the sentences are semantically equivalent in (2) and (3). However, the work of this economy principle can be indirectly observed in constructions that require parallelism.\(^2\)

\(^2\) This section focuses on the VP Ellipsis, but the pseudogapping construction as
We have seen that the sentence in (1) is ambiguous. Interestingly, the ambiguity disappears when the sentence is an antecedent for VP ellipsis as in (4) and (5).\(^3\) The first sentence of each example is associated with the \(\exists \gg \forall\) reading, but not with the \(\forall \gg \exists\) reading.

(4) A boy admires every teacher, and Mary does (=admir\(\exists\) every teacher), too. \(\exists \gg \forall, \forall \gg \exists\) (p. 32)

(5) A boy admires every teacher, and every girl does (=admir\(\exists\) every teacher), too. \(\exists \gg \forall, \forall \gg \exists\) (p. 38)

At LF, the sentences which undergo ellipsis contain a name and a quantifier in (4), and two universal quantifiers in (5). In both examples, (optional) QR is not motivated in the second sentence since the movement of the object across the subject does not yield a different semantic interpretation. The antecedent and the ellipsis sentence are required to have isomorphic syntactic representations at LF, by parallelism. When the sentence that undergoes ellipsis shows the surface scope order, the antecedent must also have the same scopal configuration. The antecedent of (4) and (5) thus becomes disambiguated.

Note that when the sentence that undergoes ellipsis has an indefinite and a universal quantifier as in (6), the antecedent is still ambiguous.

(6) A boy admires every teacher, and a girl does (=admir\(\exists\) every teacher), too. \(\exists \gg \forall, \forall \gg \exists\) (p. 33)

Fox claims that QR is sensitive to the quantifier-variable relation as well as the interaction between the scope-bearing expressions.\(^4\) (7)

well is discussed in Chapter 2 of Fox (See Section 5.2. of this paper). In addition to parallelism, Chapter 6 suggests Condition A as a possible detector of LF positions of QR since it is well known that \(A^\prime\)-movement affects Condition A as in (i). The contrast in (ii) supports the predictions of Scope Economy.

(i) a. ??John and Bill wonder who bought pictures of each other.
   b. John and Bill wonder which pictures of each other Mary bought.
   (p. 198)

(ii) a. \(\forall\)The two rivals hoped Bill would hurt (every one of) each other’s operations.
   b. The two rivals hoped someone would hurt (every one of) each other’s operations. (ibid.)

\(^3\) Tomioka (1995) presents a different view on the interpretation of sentences with two universal quantifiers as in (5).

\(^4\) Fox also shows that the Scope Principle affects the interaction of negation and DPs. See Section 5.2 of his book.
shows that quantifiers can move and bind a variable.\(^5\)

(7) The person who was invited to talk about it knows the capital of [every country]. (p. 37)

Scope Economy does not allow the movement of ‘every country’ across the subject in (8) since there is no variable to be bound in the subject and thus the movement is semantically vacuous.

(8) The person who was invited to talk about these countries knows the capital of [every country].

Consider the possible interpretation(s) of the first sentence in (9) and (10).

(9) Someone in the audience knows the capital of every country. [The person who was invited to talk about it] does (=knows the capital of every country), too. \(\exists \succ \forall, \forall \succ \exists\)  (p. 37)

(10) Someone in the audience knows the capital of every country. [The person who was invited to talk about these countries] does (=knows the capital of every country), too. \(\exists \succ \forall, \forall \succ \exists\)  (ibid.)

The antecedent sentence in (9) is ambiguous. The quantifier in the ellipsis site can be raised to bind the pronoun or stay inside the VP. When the binding occurs in the ellipsis site, the object QP in the first sentence is raised as well to satisfy the parallelism constraint. When the binding does not occur, the object QP is only raised to the VP adjoined position in both sentences. In (10), where there is no variable to be bound in the sentence undergoing ellipsis, the object QP cannot be moved from the ellipsis site over the subject due to Scope Economy. Parallelism forces the same result in the antecedent sentence.

Quantifier Scope in coordinate structures adds an argument in favour of Scope Economy. Fox introduces the following two assumptions generally held to account for the coordinate structure constraint (CSC).

(11) a. Extraction out of a coordinated structure is possible only when the structure consists of two independent substructures, each composed of one of the coordinates together with materials above it up to the landing site (hence-force, component structures).

\(^5\) Fox carefully chooses environments where WCO effects are very weak.
b. Grammatical constraints are checked independently in each of the component structures. (p. 50)

Based on Ruys (1993)'s suggestion, Fox gives an explicit account for the contrast in (12) and (13).

(12) A (#different) student likes every professor and hates the dean. \( \exists > \forall, * \forall > \exists \) (p. 52)

(13) A (different) student likes every professor and wants him\(_1\) to be on his committee. \( \exists > \forall, \forall > \exists \) (ibid.)

In (13), the object QP can be raised across the subject, violating the CSC. This is because the sentence is associated with the following two component structures, neither of which violates any grammatical constraints.

(14) **Component Structures of (13)**
1. every professor\(_1\), a student likes t\(_1\)
2. every professor\(_1\), a student wants him\(_1\) to be on his committee. (p. 52)

In the second structure, the pronoun is analysed as a resumptive pronoun at LF. The sentence (12) cannot be associated with a set of grammatical component structures when the object QP is raised over the subject.

(15) **Component Structures of (12)**
1. every professor\(_1\), a student likes t\(_1\)
2. every professor\(_1\), a student hates the dean.

The second structure violates the ban on vacuous quantification.

Scope Economy predicts that a binding configuration such as in (13) is impossible when the movement of the object QP does not affect the interpretation of the first conjunct. His prediction is verified by the example in (16).\(^6\)

(16) *Billy wants to date [every girl in this class] and has already asked her\(_1\) out. (p. 53)

(17) A boy wants to date [every girl in this class] and has already asked her\(_1\) out. (p. 54)

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\(^6\) Fox notes the possibility of telescoping in (i).

( i ) Mary likes every professor\(_1\) and wants him\(_1\) to be on her committee. (p. 55)

He suggests that we can differentiate the real binding from the illusionary binding as seen in (i) by using downward-entailing operators.
The movement of the object QP across ‘Billy’ is semantically vacuous in (16). When the movement is banned, the object is raised only to the closest VP adjoined position, from where the binding in question is impossible.

Fox is aware that if the Scope Principle is real, we have to admit that syntactic operations are constrained by interpretations of the sentence. He suggests a revision of the Modularity Hypothesis as follows.

(18) *The Revised Modularity Hypothesis (RMH)*

Among the Semantic Systems there is a formal deductive system (DS) that conditions certain syntactic operations. Syntactic operations are not conditioned by other Semantic Systems. (p. 68)

Fox does not assume that syntactic operations are conditioned by every aspect of the semantic system. He points out that Scope Economy is not sensitive to the equivalence of truth conditions under surface and inverse scope as in the case of (19).

(19) In our class that consists of 40 students, at least one girl is taller than every boy. (p. 70)

The VP ellipsis sentence in (20) is grammatical, in contrast with (21).

(20) In our class that consists of 40 students, at least one girl is taller than every boy and has threatened to beat him up. (p. 72)

(21) *In our class that consists of 40 students, Mary is taller than every boy and has threatened to beat him up.* (ibid.)

Syntactic operations are only sensitive to the properties of logical terms such as commutativity of quantificational expressions and variable binding.

Lastly, Fox discusses why only scope-shifting operations are subject to Scope Economy. His speculation is that there is a general output condition that requires any syntactic operation to affect semantic or phonological output. QR and QL do not affect phonology, thus they must affect semantic interpretation.

3. VB Economy

The second economy condition is called VB Economy or Rule H. Fox owes the basic idea for this condition to Heim (1993). One of the main contributions by Fox here is to present new and convincing evidence to support the existence of VB Economy. Let us see how VB
Economy works. This economy condition makes a variable bound by the closest position available for a designated interpretation. Thus non-local variable binding is allowed only when it gives a representation semantically different from local variable binding.\(^7\)

Consider the example in (22).

(22) Every boy\(_1\) thinks that he\(_1\) likes his\(_1\) mother.

a. Every boy thinks that he likes his mother.
    
    b. Every boy thinks that he likes his mother.

VB Economy disallows binding of ‘his’ by ‘every boy’ as in (22b) since non-local binding in (22b) and local binding in (22a) are semantically indistinguishable.

Now consider (23).

(23) Every boy\(_1\) thinks that only he\(_1\) likes his\(_1\) mother.

a. Every boy thinks that only he likes his mother.
    
    b. Every boy thinks that only he likes his mother.

The sentence in (23) is ambiguous. One reading describes a situation such as the following; in John’s mind, Bill doesn’t like his mother, Kate, Tim doesn’t like his mother, Mary, ..., John is the only person who likes his mother, which is Beth, but in Bill’s mind, John doesn’t like his mother, Beth, Tim doesn’t like his mother, Mary, ..., Bill is the only person who likes his mother, which is Kate, etc. This reading is associated with local variable binding in (23a). The other reading, which is induced by non-local binding in (23b), illustrates a different type of situation. To give an example, John thinks that John’s mother, Beth, is quite unpopular and it is only her son, John, that likes her

\(^7\) Note that non-local binding is possible when local binding is impossible. Fox discusses two cases; one is due to lack of c-command as in (i), and the other involves violation of theta criterion as in (ii).

(i) Bill said that all of his friends like his mother. (p. 131)

(ii) John seems to himself to \(t\) be smarter than everyone in his class. (p. 132)
very much, and Bill thinks that his mother, Kate, is only liked by him, but not other persons, etc.

The ambiguity of (23) shows that non-local binding is possible when it is semantically informative. But we cannot obtain direct evidence from (22) that VB Economy blocks semantically vacuous non-local binding since both types of binding give semantically identical representations. Fox uses the VP ellipsis constructions again to confirm the work of the principle.8

(24) *Every boy said that Mary liked his dog.

    ____________

Well, Mary did (=said that she liked her dog), too.

    ____________

*by Parallelism

    ____________

*by VB Economy  (p. 119)

In (24), the matrix subject binds the possessive pronoun in the first sentence. To satisfy by the requirement of structural parallelism, the possessive pronoun in the ellipsis site must be also bound by the matrix subject.9 However VB Economy prohibits this non-local binding since it only derives the same interpretation as local binding does.

The sentence (24) becomes grammatical when we replace the embed-

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8 In Chapter 3, Fox starts from giving an account of Dahl (1974)'s puzzle by VB Economy and Parallelism. Dahl observed that pronouns are interpreted in restricted ways in ellipsis sentence. In (i), the first pronoun cannot have a strict reading when the second pronoun is interpreted under sloppy identity.

(i) John1 said that he1 likes his1 mother.
Bill did (=said that he likes his mother), too.

a. John said that he likes his mother.

b. Bill said that he(=John) likes his mother.  (p. 112)

VB Economy requires local binding of the pronouns in the antecedent. Thus the parallelism requirement cannot be met when the matrix subject in the ellipsis binds the possessive pronoun. Fox extends Dahl's puzzle, and presents various original data, some of which are introduced here.

9 Fox assumes that parallelism ensures the parallel interpretation between the antecedent and the elided VP as follows.

(i) NP Parallelism
NPs in the antecedent and elided VPs must either

a. have the same referential value (Referential Parallelism) or
b. be linked by identical dependencies (Structural Parallelism).  (p. 117)
ded subject of the antecedent with a bound pronoun as in (25), or when we add ‘only’ to the matrix subject in the ellipsis as in (26).

(25) Every boy₁ said that he₁ liked his₁ dog.
    Well, Mary₂ did (=said that she₂ likes her₂ dog), too. (ibid.)

(26) Every boy₁ said that Mary liked his₁ dog.
    Well, (as for girls,) only Mary₂ did (=said that she₂ likes her₂ dog), too.

In (25), the embedded subject locally binds the possessive pronoun in both sentences, satisfying the requirement of VB Economy and parallelism. In (26), the matrix subject can bind the possessive noun in both sentences. Non-local binding is possible in the ellipsis site since it yields a different interpretation from local binding here.

It should be noted here that Fox suggests a possible unification of scope economy and VB economy: Prefer (representations with) shorter dependencies. He, however, admits that restrictions on QL cannot be explained straightforwardly under the unified approach since QL reduces the length of dependencies and therefore should be expected to be encouraged, contrary to what Fox concludes from his observations.

4. OV Economy

OV Economy defines an optimal formulation for operator-variable constructions. It is a modification of the condition proposed in Chomsky (1993) which explains a general inability of A'-movement to bleed Condition C.¹⁰ Fox states OV Economy as follows.

(27) **OV Economy**

Given an A'-chain, α, choose the operator-variable (OV) construction that is closest to α given the set of interpretable options.

An Operator-variable construction O₁ is closer to a chain α than O₂ if the set of positions at the tail of α that are maintained in O₂ is a proper subset of the parallel set in O₁.

(PP. 177–178)

¹⁰ Fox argues that Condition C applies only at LF. He shows in Chapter 5 that Scope Reconstruction is impossible when it yields a Condition C violation. It is demonstrated in Chapter 6 that QR obviates Condition C in the Antecedent-contained deletion (ACD) construction. Fox’s discussion of ACD will be outlined in the present section.
Let us consider an OV construction assigned to the sentence in (28).

(28) John likes every boy. (p. 178)

(29) John [every boy [likes every boy]] (ibid.)

(30) a. John [every boy\textsubscript{x} [likes boy x]] *by OV Economy (ibid.)

Given the copy theory of movement (and Scope Economy), the sentence is represented as in (29) at LF. There are two interpretable options of (29), namely (30a) and (30b). The OV construction in (30a) is closer to (29) than (30b) since it retains information at the tail position of (29) better than the other option. OV Economy therefore prefers (30a) to (30b). Fox suggests that ‘boy x’ in (30a) is interpreted as a definite description ‘the boy identical to x’ and that (30a) amounts to saying ‘For each boy x, John likes the boy identical to x.’

Let us next consider the sentence in (31), which has (32) as the output of QR.

(31) ??/*You introduced him\textsubscript{1} to everyone that John\textsubscript{1}’s mother met. (p. 180)

(32) You [[everyone that John\textsubscript{1}’s mother met] [introduced him\textsubscript{1} to everyone that John\textsubscript{1}’s mother met]]

(32) is converted to one of the OV constructions in (33).\textsuperscript{12}

(33) a. You [[everyone that John\textsubscript{1}’s mother met] [introduced him\textsubscript{1} to [x one that John\textsubscript{1}’s mother met]]]

*by Condition C (p. 180)

b. You [[everyone that John\textsubscript{1}’s mother met] [introduced him\textsubscript{1} to x]]

*by OV Economy

OV Economy prefers (33a) to (33b) since the former maintains the restriction of the quantifier. However, the preferred construction violates Condition C, thus the sentence in (31) is judged as marginal at best.

(31) shows that a Condition C violation does not result in elimination of the relevant structure from the set of interpretable options under consideration. Fox investigates whether there is a circumstance where the most optimal OV construction is excluded from the reference set.

\textsuperscript{11} The trace of the subject is ignored here.

\textsuperscript{12} In (33a), a variable is placed before the restriction, following Fox. This is just for clarity of presentation and is not intended any difference in the interpretation.
and finds that antecedent-contained deletion (ACD) constitutes such a case.

(34) You introduced him₁ to everyone that John₁’s mother did
<introduce him₁ to t>.

(35) You [[everyone that John₁’s mother did <introduce him₁ to t>]
[introduced him₁ to everyone that John₁’s mother did
<introduce him₁ to t>]]

(36) a. You [[everyone that John₁’s mother did <introduce him₁ to t>],
[introduced him₁ to [x one that John₁’s mother did<br>introduce him₁ to t>]] *by Parallelism (p. 181)

b. You [[everyone that John₁’s mother did <introduce him₁ to t>],
[introduced him₁ to x]]

Suppose a theory of VP ellipsis that assumes PF deletion by LF Parallelism. (34) ends up with the OV constructions in (36). In (36b), the antecedent VP (in square brackets) is identical to the elided VP (in angle brackets), but in (36a) the two VPs do not have parallel structures. (36a) is thus not counted as an interpretable option of the chain and OV Economy chooses (36b).

We have seen that OV Economy prefers the construction that maintains the information contained at the tail of the chain as much as possible. Note that the quantifier restriction at the head of the chain is kept intact in the operator-variable formation. Fox assumes (literal) reconstruction when the moved material is interpreted in its original position or some intermediate position. Consider (37).

(37) How many people did Mary decide to hire?

a. (many > decide)
   What is the number n, such that there are n many people x, such that Mary decided to hire x

b. (decide > many)
   What is the number n, such that Mary decided to hire n many people

(37) is ambiguous and the reading in (37b) derives from the reconstruction of ‘many people’ as in (38b).

(38) a. how many people did Mary decide to hire how many people

b. how did Mary decide to hire how many people

(Reconstruction)

(39) **OV Variants of (38a)**

a. how, n many people, did Mary decide to hire x people
b. how_n n many people_x did Mary decide to hire x

*by OV Economy

(40) OV Variant of (38b)

how_n did Mary decide to hire n many people

OV Economy regulates the interpretation of A'-chain, but not A-chain. (41) shows that A-movement bleeds Condition C while A'-movement does not.

(41) a. Every argument that John_1 is genius seems to him_1 to be flawless.

b. ??/*Which argument that John is genius did he_1 believe it?

c. *A different person told him_1 about every argument that John_1 is a genius. (p. 195)

A-movement does not seem to leave anything that violates Condition C. Fox states that A-movement (optionally) leaves a simple trace. His position is neutral as to the issue whether A-movement can leave a copy, but he points out that if it cannot, there will be no literal reconstruction and some other scope-shifting operation such as QL is responsible for A-reconstruction phenomena.

5. Discussion

This section first presents some counterexamples to the applicability of Scope Economy. We then turn to the two kinds of parallelism constraints assumed in Fox and discuss their implication to the scope of scrambled phrases in Japanese.

5.1. Shortest Move, QL and Reconstruction

Fox assumes that QR is constrained by Shortest Move as we have seen in Section 2. He explains the contrast in (42), relying on this assumption.

(42) a. One girl knows that every boy bought a present for Mary. 

∃ > ∀ , *∀ > ∃

b. One girl knows what every boy bought for Mary.

∃ > ∀ , ∀ > ∃ (p. 64)

In (42a), ‘every boy’ cannot be raised to a CP adjoined position since ‘that’ in C does not scopally interact with ‘every boy.’ But in (42b), ‘every boy’ and ‘what’ in Spec-CP do interact and ‘every boy’ can be raised to a CP adjoined position. ‘Every boy’ is then raised to a VP
adjoined position crossing over ‘know’ and moved to an IP adjoined position crossing ‘one girl,’ yielding the $\forall > \exists$ reading.

This account of Fox is questioned in Dayal (2000). She points out that the movement of the universal quantifier over the extensional verb ‘know’ is semantically vacuous and therefore disallowed by Scope Economy. The ambiguity here is rather explained by local movement of the universal quantifier and interaction of ‘one girl’ and the indirect question as shown in Moltmann and Szabolsci (1994). She also notes that the relevant $\forall > \exists$ reading is not available with intensional verbs like ‘wonder.’ In (43), ‘wonder’ does not seem to motivate movement of ‘every boy’ over itself although the movement would affect the interpretation of the sentence.

(43) One girl wonders what every boy bought for Mary.

$\exists > \forall$, $\forall > \exists$

Consider now the pair reading of the following example, which is introduced in Fox as a case that involves several instances of QR.

(44) What did you say that every boy bought?

$\exists > \forall$, $\forall > \exists$  (p. 65)

He assumes that a copy of ‘what’ left in every maximal projection motivates every instance of QR. However, there is a problem for this account. It is well known that pair-list reading is blocked when a wh-phrase moves from the embedded subject position as in (45).

(45) Who did you say bought every present?  $\exists > \forall$, $\forall > \exists$

Copies of ‘who’ are expected to motivate a series of iterated applications of QR. The lack of a pair-list reading suggests that ‘every present’ is somehow not raised over ‘who.’ The contrast shown here can be accounted for, again without assuming non-local movement of the universal quantifier. Chierchia (1993), for example, assumes in a wh-trace position a complex variable bound by the universal quantifier. Binding of this variable is not possible in (45) since a WCO violation results when the universal quantifier is raised over the subject trace.

We have now no clear evidence for Shortest Move. What is worse, there is a counterexample that Fox himself admits. The universal quantifier seems to be confined within the clause boundary so far, but it can be moved out of the infinitival clause.

(46) Someone expects Sue to marry everyone.

$\exists > \forall$, $\forall > \exists$  (p. 65)

The two possible solutions proposed by Fox are: (i) assumption of a null modal operator in I in the embedded clause, and (ii) application of
Shortest Move to Obligatory QR, but not to Optional QR.

It is important to note here that Fox assumes only QR to be constrained by Shortest Move. According to his footnote 6 of Chapter 2, this is due to lack of evidence to show whether Shortest Move applies to QL. Contrary to what Fox states, his QL examples appear to involve movement violating Shortest Move.\(^{13}\)

Let us take a look at (47) and (48).

\begin{align*}
(47) & \text{An American runner seems to Bill to have won the gold medal. A Russian athlete does, too.} \quad \exists > \text{seem, seem} > \exists \quad \text{(p. 47)} \\
(48) & \text{An American runner seems to Bill to have won the gold medal. Sergey does, too.} \quad \exists > \text{seem, } ^\ast \text{seem} > \exists \quad \text{(p. 48)}
\end{align*}

The first sentence of (47) is ambiguous due to the lowering of the indefinite subject to (an IP-adjoined position c-commanding) its trace position.\(^{14}\) In (48), the lowering of the name in the ellipsis site is inhibited by Scope Economy. Then the indefinite in the antecedent cannot be lowered down either, due to parallelism.

In (47), Shortest Move first places the indefinite in a VP-adjoined position c-commanding an intermediate trace in the Spec-VP first. This lowering movement is vacuous from the standpoint of interpretation and banned by Scope Economy. The ambiguity of (47), however, suggests that a subject is lowered to somewhere below ‘seem,’ skipping over the VP.

\(^{13}\) In addition to VP Ellipsis as shown below in this section, the coordination is used to argue for Scope Economy imposed on QL.

\begin{align*}
(\text{i}) & \text{A guard is standing in front of every church and sitting at the side of every mosque.} \quad \text{(p. 61)} \\
(\text{ii}) & \# \text{A guard is standing in front of every church and sitting at the side of this mosque.} \quad \text{(ibid.)}
\end{align*}

\(^{14}\) Fox takes the position that QL could move a quantifier to its trace position, or to an adjoined position that c-commands the trace. The choice between the two is crucial to any proposal assuming Diesing (1992)’s Mapping Hypothesis (See Hornstein (1995), for example). Diesing proposes that definite/presuppositional DPs cannot be inside VP at LF. The name in (i) below, is not lowered into VP, independent of Scope Economy.

\begin{align*}
(\text{i}) & \text{John admires every teacher.} \\
(\text{ii}) & \text{A boy admires every teacher, and Mary does, too.} \quad \exists > \forall, \ ^\ast \forall > \exists
\end{align*}

If Diesing is right, the disambiguation in (ii) does not constitute strong evidence for Scope Economy applying to QL, contrary to what Fox says.
Remember now that Fox countenances two operations possibly responsible for scope reconstruction; QL, which is constrained by Scope Economy, and reconstruction (See section 4 above). If there are two strategies to restore a quantifier to the trace position, a successful application of one suffices to get a designated interpretation. Boeckx (2001), for example, argues for literal reconstruction of indefinites. He proposes that covert insertion of ‘there’ at the case position forces the indefinite to go down the tree. Non-indefinites, which cannot be associated with ‘there,’ cannot reconstruct as a whole, for their Case to be checked at the highest occurrence of the chain.\footnote{Boeckx argues for Pesetsky and Torrego (2001)’s treatment of Case. Nominative Case is an uninterpretable T(ense) feature, which is deleted when the nominative subject is attracted to Spec-TP by finite T which bears uninterpretable \$\}$\footnote{For the reason why ‘himself’ cannot be interpreted at its surface position, see Hornstein (2001), for example. He suggests an account in the Minimalist framework.} features with an EPP property.} However, a portion of the A-moved elements can reconstruct when their features have been checked before being pied-piped. Boeckx discusses the fact that the subject in (49) has a future-oriented interpretation when the relative clause is lowered and interpreted under the future-oriented raising verb ‘likely.’

\begin{equation} \text{(49) Everybody who shows up is likely to be a psychologist.} \tag{Boeckx (2001: 515)} \end{equation}

We must be aware that given Boeckx’s proposal, the contrast in (47) and (48) can be explained independent of Scope Economy. The second sentence in (48) has a definite subject, ‘Sergey,’ which cannot be reconstructed back to the trace position for case reasons. Following Boeckx, we can also account for the following contrast.\footnote{Kaplan (1978) discusses that ‘that N’ is a rigid designator.}

\begin{equation} \begin{array}{ll}
\text{(50) a.} & \text{Those pictures of himself seem to have struck John as amazing.} \\
\text{b.} & \text{*Himself seems to have struck John as amazing.}
\end{array} \tag{50} \end{equation}

‘Of himself’ in (50a) reconstructs, but ‘himself’ in (50b) cannot, being definite and a subject by itself. Note that Scope Economy does not allow the lowering of the subject crossing ‘seem’ in both sentences. The lowering is semantically vacuous since the subjects there are rigid designators just like names.\footnote{For the reason why ‘himself’ cannot be interpreted at its surface position, see Hornstein (2001), for example. He suggests an account in the Minimalist framework.}
There is yet another set of examples Scope Economy cannot handle well straightforwardly. Boeckx shows that A-reconstruction is blocked by negation.

(51) A man is likely not to win the lottery.
\[ \exists > \text{likely} > \text{not}, \text{likely} > \exists > \text{not}, \ast \text{likely} > \text{not} > \exists \]

(p. 532)

(52) Someone isn’t arrived yet. \[ \exists > \text{not}, \ast \text{not} > \exists \] (ibid.)

Negation, however, is not a barrier for QR. Fox discusses the fact that QR across negation is permitted by Scope Economy in (53), yielding a different semantic interpretation from surface scope.

(53) John doesn’t speak more than three languages.
\[ \text{more than } 3 > \text{not}, \text{not} > \text{more than } 3 \] (p. 69)

Negation in (51) and (52) is then naturally expected to motivate QL, but the indefinites are not interpreted under the scope of negation.

Boeckx also claims that A-reconstruction is blocked by another quantificational expression.

(54) a. A red car seems to me to be parked at the corner.
\[ \exists > \text{seem}, \text{seem} > \exists \]

b. A red car seems to everyone to be parked at the corner.
\[ \exists > \text{seem}, \ast \text{seem} > \exists \]

In (54b), ‘everyone’ appears to obstruct the reconstruction of the indefinite subject. This blocking effect is unexpected from the standpoint of Scope Economy. The universal and the existential quantifiers are not commutative, so there should be no problem with the lowering of the subject down the experiencer.

To conclude the discussion so far, we do not seem to have strong evidence for (i) Shortest Move, nor (ii) a lowering operation constrained by Scope Economy. The lowering operation we have seen is rather sensitive to the definiteness of A-moved elements and intervening negation and quantifiers. Boeckx maintains that the blocking effect is due to Relativized Minimality and should be analysed on a par with Beck (1996)’s intervention effects, which are obtained under A’-movement. Neither negation nor a quantifier can intervene between two German wh-phrases, a German wh expression and its modifier, and a covert ‘there’ and its reconstructed associate.\(^{18}\)

\(^{18}\) The blocking effect occurs when there are two related expressions. Note that negation is an island for A’-reconstruction of ‘how many’ questions, but quantifiers
(55) a. ??Wen hat niemand wo gesehen?
whom has nobody where seen
‘Where did nobody see whom?’ (Beck (1996: 3))
b. Wen hat jeder wo gesehen?
whom has everyone where seen
‘Where did everyone see whom?’
   Pair list reading only (∀ > wh) (ibid., p. 19)

(56) a. ??Wen hat keine Studentin von den Musikern getroffen?
whom has no student of the musicians met
‘Which of the musicians did no student meet?’
   (ibid., p. 4)
b. Wen hat jede Studentin von den Musikern getroffen?
whom has every student of the musicians met
‘Which of the musicians did every student meet?’
   Pair list reading only (∀ > wh) (ibid., p. 19)

(57) a. (= (52)) Someone isn’t arrived yet. ∃ > not, *not > ∃
b. [there [someone]] isn’t [arrived yet]
   *

(58) a. (= (54b)) A red car seems to everyone to be parked at
the corner. ∃ > seem, *seem > ∃
b. [there [a red car]] seems to everyone [to be parked at
   *
the corner]

5.2. Direct Parallelism/Indirect Parallelism

We have seen in Section 2 and 3 that Fox uses parallelism to test the predictions of Scope Economy and VB Economy. In Chapter 3, Fox discusses the formulation of the parallelism constraint, specifically, two types of parallelism that license VP Ellipsis; Direct Parallelism and Indirect Parallelism. The former requires structural identity as demonstrated in the previous sections of this paper. The latter, which is developed in Rooth (1992) and Tancredi (1992), involves accommodation such as ‘everyone’ do not block the reconstruction. See Rullman (1995), for more details.
of the propositions inferred from the antecedent sentence. This section investigates how the two parallelism constraints interact with one another. We will review Fox’s proposal and then examine the scope of scrambled phrases in Japanese.

Let us begin by presenting arguments for Indirect Parallelism. Rooth (1992) and Tancredi (1992) demonstrate that the parallelism constraint is observed in the sentences with the phonologically reduced phrase as well as those with the ellipsis. In (59) below, the antecedent of both sentences only has the wide scope reading of ‘some girl’ (phonologically reduced phrases appear in smaller font hereafter).

(59)  a. Some girl saw every teacher, and Bill did (=saw every teacher), too.
     b. Some girl saw every teacher, and Bill saw every teacher, too.

While deletion occurs under identity in Ellipsis, the reduced phrase does not require an identical object in the antecedent clause.

(60) Some girl saw every teacher, and Bill saw many teachers, too.

The parallelism required in the focus construction seems rather to be a pragmatic or semantic constraint in general. This type of parallelism constraint is called Indirect Parallelism in Fox. He follows the basic ideas presented in Rooth (1992), and states that Indirect Parallelism is satisfied through an inference drawn from the antecedent clause when the inferred sentence is in the focus value of the elided or phonologically reduced sentence. Consider the contrast in (61) (F marks focus below).

(61)  a. First, Bill called Mary an idiot. Then [John]_F insulted her.
     b. *First, Bill insulted Mary. Then [John]_F called Mary an idiot.

In (61a), the antecedent implies a sentence that is in the focus value of the sentence in reduction. ‘Bill called Mary an idiot’ implies ‘Bill insulted her.’ The latter sentence is in the focus value of ‘John insulted her,’ that is the set of the sentences of the form: x insulted her. In (61b), ‘Bill insulted Mary’ does not implicate ‘Bill called Mary an idiot.’ There is no inference from the antecedent to be in the focus value of the second sentence, |p: for some x, p = x called Mary an idiot|.

Indirect Parallelism permits the ambiguity of the ellipsis in (62), which is not explained when we have only Direct Parallelism to license the ellipsis. Direct Parallelism that requires the antecedent itself is in
the focal value of the elided or phonologically reduced sentence.

(62) Bill saw every teacher, and some girl did (=saw every teacher), too.

at LF

- S1 [Bill1 [every teacher2 [t1 saw t2]]]
  S2 [some girl1 [every teacher2 [t1 saw t2]]]
- S1 [Bill1 [every teacher2 [t1 saw t2]]]
  \(\Rightarrow\) [every teacher2 [someone1 [t2 [t1 saw t2]]]]
  S2 [every teacher2 [some girl1 [t2 [t1 saw t2]]]]

To satisfy Direct Parallelism, the universal quantifier in the ellipsis site is not raised across the indefinite subject since Scope Economy disallows the movement of the universal quantifier over the name in the antecedent clause. Thus we expect only the \(\exists > \forall\) reading if Direct Parallelism is the only way to license the ellipsis in (62). Indirect Parallelism is satisfied in the LF structure that corresponds to the \(\forall > \exists\) reading of the ellipsis as shown in (62b). The antecedent S1 entails the proposition; for every teacher, there is someone who saw him. This proposition is a member of the focus value of S2, \(\{p: \text{for some } Q, p = [\text{every teacher}_y [Q_x [x \text{ saw } y]]]\}\).

Fox maintains that the ellipsis and the reduction are licensed by either Direct Parallelism or Indirect Parallelism. However, note that Indirect Parallelism is also satisfied in the LF structure corresponding to the \(\exists > \forall\) reading in (62a). The antecedent entails the proposition ‘there is someone who saw every teacher,’ which is included in the focus value of S2, namely, the set \(\{p: \text{for some } Q, p = [\text{every teacher}_y [Q_x [x \text{ saw } y]]]\}\). Actually, Indirect Parallelism appears to license all the ellipsis and reduction examples that are licensed by Direct Parallelism that we have discussed so far. It is a natural question then whether we need Direct Parallelism at all.19 The rest of this section

19 Tomioka (1995), for example, doubts the existence of the syntactic parallelism constraint and Scope Economy. Elaborating Schwartzschild (1996)’s theory of focus, he explains the contrast in (i) without recourse to the LF position of the quantifiers in the sentences.

( i ) a. (=(4)) A boy admires every teacher, and Mary does, too.

\(\exists > \forall, \forall > \exists\)

b. (=(6)) A boy admires every teacher, and a girl does, too.

\(\exists > \forall, \forall > \exists\)
presents arguments for Direct Parallelism and then a counterexample to a prediction made by Direct Parallelism.

Let us start with Fox's examples that indicate some constraint on the application of Indirect Parallelism. Recall that in (62) Indirect Parallelism guarantees the inverse scope order even when the relevant raising operation is blocked in the antecedent clause. It turns out, however, that this licensing mechanism is not always available for cases of ellipsis. Consider the contrast in (63).

(63) a. John likes every teacher. [At least one girl]_F does (=likes every teacher), too.  \( \exists > \forall, * \forall > \exists \)

b. John likes every teacher. At least one [girl]_F does (=likes every teacher), too.  \( \exists > \forall, \forall > \exists \)  (p. 103)

When the whole subject of the sentence where ellipsis occurs is focused as in (63a), we do not seem to resort to Indirect Parallelism and assure the inverse scope order in the ellipsis site. An explanation suggested by Fox is that Indirect Parallelism is a last resort mechanism and is only available when there is accommodation seeking material in the ellipsis. Accommodation seeking material is the material presupposed (hence non F-dominated) but nevertheless absent in the antecedent clause.

Going back to (63a), we find every constituent in the ellipsis is either focused or included in the antecedent sentence. Thus there is no motivation to accommodate the inference of the antecedent to meet the parallelism requirement. When only 'girl' is focused as in (63b), 'at least one' triggers accommodation since it is neither focused nor has an identical expression in the antecedent. The implication of the first sentence, 'for every teacher, there is someone who likes him,' is accommodated to meet the parallelism requirement and the sentence obtains the \( \forall > \exists \) reading. The example in (62) also has 'some' unfocused (under the normal circumstance), and this makes the relevant accommodation possible.

Now what we must observe is that the ellipsis in (63a) should be licensed by Direct Parallelism since the accommodation that is necessary for Indirect Parallelism does not occur. The contrast in (63) amounts to recognising Direct Parallelism.

Let us now consider a case in which Indirect Parallelism predicts an unavailable interpretation if there is no constraint on accommodation at all.

(64) (=6) A boy admires every teacher, and a girl does (= admires every teacher), too.
If accommodation is possible in (64), we should have the interpretation that corresponds to the scope order illustrated in (64c). The wide scope reading of the universal quantifier in the antecedent entails the wide scope reading of the indefinite expression. Consequently, even when the antecedent has the $\exists > \forall$ reading, the ellipsis is expected to have the $\forall > \exists$ reading through implicational bridging. However, it is obvious that this reading is missing in (64). We know that accommodation is not motivated here since there is no material that is free of focus and at the same time not present in the antecedent sentence. The ellipsis under the two readings in (64a, b) are therefore ensured by Direct Parallelism.

There are, however, some cases where Direct Parallelism predicts a reading that is not present in the ellipsis construction. Relevant examples come from Japanese sentences which have undergone scrambling. Let us remind ourselves of some properties of scrambling. First, Japanese sentences have an interpretation according to their surface scope order when nothing in them is scrambled. Scrambling changes the scope relation of the DPs in the sentence.

(65) a. Dareka-ga daremo-o aisiteiru.
   someone-Nom everyone-Acc love
   ‘There is someone who loves everyone.’

b. Daremo-o dareka-ga aisiteiru.
   everyone-Acc someone-Nom love
   ‘For each person, there is someone who loves that person.’ Or ‘There is someone who loves everyone.’

We will assume that the second reading of (65b) is obtained through literal reconstruction, following Saito (1989). Lastly, remember that scrambling changes the order of DPs even when it is semantically vacuous.

(66) a. Daremo-ga John-o aishiteiru.
   everyone-Nom John-Acc love
   ‘Everyone loves John.’

   John-Acc everyone-Nom love
   ‘John, everyone loves.’
Now we are ready to examine the VP Ellipsis examples in (67).\(^{20}\) (67a, b) differ only in the position of the phonologically reduced phrase; no scrambling is involved in the second sentence in (67b).\(^{21}\) The two examples coincide when the phrase is further reduced and elided completely. There is no difference in the interpretation of both examples.

(67) a. Dono gesuto-ni-mo\(_1\) Tanaka-sensei-ga\( t_1 \)
    every guest-Dat-also Tanaka-teacher-Nom
    hanataba-o watashita.
    bouquet-Acc hand

    (Dono gesto-ni-mo\(_1\)) [hitori-no shoojo-mo]\(_F\) \( t_1 \) \( \emptyset \) watashita.
    (every guest-Dat-also) one girl-also hand

    *‘For each guest, Mr. Tanaka gave a bouquet to him.  
    For each guest, there was a girl who gave one (=a bouquet) to him, too.’

\( \checkmark \)‘Mr. Tanaka gave a bouquet to every guest. 
There was a girl who gave one (=a bouquet) to every guest, too.’

b. Dono gesuto-ni-mo\(_1\) Tanaka-sensei-ga\( t_1 \)
    every guest-Dat-also Tanaka-teacher-Nom
    hanataba-o watashita.
    bouquet-Acc hand

    [Hitori-no shoojo-mo]\(_F\) (dono gesto-ni-mo) \( \emptyset \)
    one girl-also (every guest-Dat-also)
    watashita.
    hand

    *‘For each guest, Mr. Tanaka gave a bouquet to him.  
    A girl gave one (=a bouquet) to every guest, too.’

\( \checkmark \)‘Mr. Tanaka gave a bouquet to every guest. 
There was a girl who gave one (=a bouquet) to every guest, too.’

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\(^{20}\) These types of examples are analyzed as VP Ellipsis in Otani and Whitman (1991). Some recent literature treat them as NP Ellipsis, which is also licensed under parallelism. See, for example, Kitagawa (1999), Kim (1999), Hoji (1998) and Oku (1998).

\(^{21}\) The second sentence of (67b) reads better with stress on (at least a part of) the subject when there is a phonologically reduced phrase present. The second occurrence of ‘mo (also)’ seems to obstruct the processing of the sentence.
What is crucial is that the elided sentence (67a) does not have the object wide scope reading although Direct Parallelism is satisfied by the sentence. One of the LF structures of the first sentence, namely, 
\[
[\text{every guest}_3 \ [\text{Tanaka}_1 \ [\text{a flower}_2 \ [t_1 \ \text{give} \ t_2 \ \text{to} \ t_3]]]],
\]
is structurally isomorphic to the LF structure of the elided sentence corresponding to the inverse scope order, 
\[
[\text{every guest}_3 \ [\text{one girl}_1 \ [\text{a flower}_2 \ [t_1 \ \text{give} \ t_2 \ \text{to} \ t_3]]]].
\] Indirect Parallelism is not available when the whole subject ‘hitori no shoojo-mo (one girl-also)’ is focused and no accommodation seeking material is in the sentence.

It is interesting to note that the wide scope reading arises when only ‘shoojo (girl)’ is stressed in (67a). The accommodation is now triggered by ‘hitori-no (one).’ One of the propositions entailed by the antecedent is ‘for every guest, there is one teacher who gave a flower to him,’ which is in the focus set of the LF structure with our attention: 
\[
\{ p: \text{for some} \ X, \ p = [\text{every guest}_y \ [\text{one member of} \ X_x \ [x \ \text{gave} \ \text{a flower to} \ y]]] \}\].
\]

Another thing to be noticed is that there is a case where Direct Parallelism does license the surface scope interpretation even when it involves scrambling just like the case in (67). Consider (68).

(68) a. Dono gesuto-ni-mo\textsubscript{1} hitori-no shoojo-ga \textsubscript{1} hanataba-o every guest-Dat-also one girl-Nom bouquet-Acc watashita.
hand
(Dono gesto-ni-mo\textsubscript{1}) \ [Tanaka-sensei-mo] t\textsubscript{1} 0 (every guest-Dat-also) Tanaka-teacher-also watashita.
hand
√‘For each guest, there was a girl who gave a bouquet to him.
For each guest, Mr. Tanaka gave one (=a bouquet), too.’
√‘There was a girl who gave a bouquet to every guest.
Mr. Tanaka gave one (=a bouquet) to every guest, too.’

b. Dono gesuto-ni-mo\textsubscript{1} hitori-no shoojo-ga \textsubscript{1} hanataba-o every guest-Dat-also one girl-Nom bouquet-Acc watashita.
hand
[Tanaka-sensei-mo] t\textsubscript{1} 0 (dono gesto-ni-mo) 0 watashita.
Tanaka-teacher-also (every guest-Dat-also) hand
√‘For each guest, there was a girl who gave a bouquet to him.
Mr. Tanaka gave one (= a bouquet) to every guest, too.’
√‘There was a girl who gave a bouquet to every guest.
Mr. Tanaka gave one (= a bouquet) to every guest, too.’

The order of the two sentences in (67) is reversed in (68), and the antecedent contains two genuine quantifiers that are mutually noncommutative. Both examples have the ∀ > ∃ reading, that is the interpretation matching the surface scope order established by scrambling. One last thing to be noticed is that the ∀ > ∃ reading of (68b) is not what we expect from the Parallelism constraints. There is no structural isomorphism between the two sentences if the quantifiers in the antecedent stay in their surface position. There is no accommodation seeking material in the ellipsis/reduction either.

We have observed some Japanese data which challenge the present formulation of the Parallelism constraints. We cannot give an account for these data in this paper, but let me at least state the generalisation drawn from the data: When the antecedent contains two scopally noncommutative quantifiers, the sentence involved in the focus construction carries the interpretation corresponding to the surface scope order.

6. Conclusion

This paper reviews three economy principles proposed in Fox; Scope Economy, VB Economy and OV Economy. Fox’s main arguments, which are solid and well-defended, are not challenged in this review, but I have discussed problems with some auxiliary claims. I have pointed out that the assumption of Shortest Move is not well motivated in the case of scope shifting operations. I cast doubt on QL, a lowering operation subject to Scope Economy. I suggested that literal reconstruction is responsible for scope reconstruction and obviation of Condition A violation. Lastly, we observed that the Parallelism constraints do not accurately predict the possible scope interpretation of the Japanese sentence in scrambling contexts.
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