

Groundbreaking achievement

Boston College economists play integral role in the largest liver transplant exchange in history

Ed Hayward | University Communications | July 2026

With the support of a donor exchange system developed by Boston College economists Tayfun Sönmez and Utku Ünver, Turkey's İnönü University recently performed the largest liver transplant exchange in history.

The so-called eight-way liver exchange involved surgeons at Inönü's medical school performing 16 operations simultaneously, involving eight recipients and eight donors. The procedures were performed on June 12 and took 22 hours.

With the historic multi-party exchange, the Banu Bedestenci Sönmez Liver Paired Exchange Program–named in honor of Sönmez's late wife and based at the Turkish university–has performed 414 liver exchange transplants since the program's inception in 2022, surpassing within four years the worldwide historical total of fewer than 250 that have taken place in the prior two decades. In 2025 alone, the system facilitated 155 liver transplants, accounting for nearly half of liver transplants done at the Institute.

The program in Turkey "has established itself as the global leader in both the scale and complexity of liver exchange," said Sönmez. "More importantly, it has demonstrated how the careful economic design of an exchange system can dramatically increase access to transplantation.



BC economists Tayfun Sönmez (right) and Utku Ünver.

"Our objective is not to set records," he added. "It is to maximize the benefit to patients and to society by facilitating as many high-quality transplants as possible, while using the smallest and least logistically demanding exchanges needed to achieve that objective."

Ünver recalled the excitement of learning

that a new group of patients had received treatment.

“Naturally, messages went back and forth between the medical team and us throughout that day as we waited for news—that is routine on surgery days,” said Ünver. “After 22 hours, word came that all of the operations had succeeded. What made it even more striking for Tayfun and me is that we were both traveling at the time, working in time zones far from our usual ones, when we identified the eight-way cycle and the operations were carried out. Professor [Sezai] Yılmaz and his team are extraordinarily experienced—they have performed more than 4,000 liver transplants over the past decade and a half—so however anxious or complicated any given day may be, there is always a reassuring confidence in the back of our minds.”

Sönmez and Ünver, both natives of Turkey, are recognized world-leading experts and developers of matching mechanisms, particularly in the area of kidney and liver exchange and transplantation. Their work in “matching markets” has also focused on how to improve K-12 school choice algorithms and the assignment of cadets to military specialties in the U.S. Army.

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The program’s ability to conduct multi-way exchanges has revolutionized liver transplantation. These complex procedures overcome the challenges of matching donors and recipients, providing life-saving transplants to patients who would otherwise not receive them. Among other factors, the program developed by Sönmez and Ünver helps to maintain transplant opportunities for multiple patients by ensuring blood-type compatibility and compatibility in the size of the liver grafts.

“The İnönü Institute's ability to field large surgical teams is what makes exchanges bigger than two-way possible—but we use that capacity only when it is needed. In 2025, exchange accounted for nearly half of all liver transplants at the Institute; at the leading Asian centers, it has traditionally contributed only a few percent,” said Ünver.

"The program has set new standards by performing the world's first four-way liver exchange in June 2022, the first five-way liver exchange in October 2023, the first six-way liver exchange in January 2024, and the first seven-way liver exchange in July 2024," said Sönmez. Some of these groundbreaking procedures were documented by the economists in two papers in the *American Journal of Transplantation*, the premier scholarly outlet for the field. In recognition of their contributions, İnönü University honored Ünver and Sönmez with honorary doctorates in 2024.

"Multi-way exchanges overcome the difficulty in matching by serving more patients—some of them in critical condition, who would not otherwise receive immediate transplants—and by providing others with better transplants than they would get in smaller exchanges or directly from their own compatible donors," said Ünver.

"However, approximately 60-70 percent of the outcomes achieved by our system could have been achieved using two-way exchanges alone. This shows that the potential benefits of liver exchange are much broader than the ability to conduct exceptionally large exchanges. The eight-way exchange is a major medical and logistical accomplishment, but it represents only one dimension of the system's success," added Sönmez.

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The economists continue to upgrade the mechanisms of their matching process.

"A great deal has changed, though the core matching algorithm has stayed the same—and what Tayfun and I contribute goes well

beyond providing software," said Ünver. "Most of the changes aim to improve recruitment of patient–donor pairs, so that the pool is structured to produce the best possible results, and we have steadily enriched the software we use to take advantage of the matches the pool makes possible.

"The Institute team can now conduct up to ten-way exchanges, simultaneously utilizing 20 surgery rooms and more than 160 medical personnel," said Ünver, up from seven-way exchanges a few years ago. "This capacity is instrumental in conducting larger exchanges. Similar capabilities do not exist in any other single center."

The economists are active partners with the medical team when the transplant procedures are in the planning and assignment stage.

"Both Tayfun and I take part in running the system day to day, and we propose the best available set of matches to the physicians," said Ünver. "We give them a broad menu of options, and the surgeons make the final choice."

Currently, in comparison with the 414 transplants performed at the Turkish medical center, only one other center in the world has passed 100 liver exchange transplants. The U.S. total last year was about 30 transplants from such exchanges.

Medical centers in India and Pakistan are in discussions with Sönmez and Ünver to put their program in place in transplant centers located in those countries.